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Achievement Motivation Influencing Academic Achievement of Secondary School Students in Relation to Variations in Gender and School Interventions

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Motivation is a concept introduced to help in understanding behavior of human beings. It is a process of arousing action, sustaining activity in progress, regulating and directing pattern of activity through energy transformation within the tissues of the organism. Human behaviour is determined both by motivation anddrives, while motivation is inborn as well as acquired, drives are completely innateor inborn. Motivations are classified by psychologists as extrinsic motivation and intrinsic motivation. Various needs have been put forth toaccount for intrinsic behaviour. Later on psychologists realized that behaviour is not only determined bymotives and drives, but also by the environmental surroundings of an individual. Atkinson (1957) definedachievement motivation as a special case of intrinsic motivation, that is, achievement motivational propensity ofneeding to feel competent and self-determining in relation to environment.

The term n-achievement or need achievement in place of achievement motivation was introduced by Murrary (1938). According to him need-achievement means to accomplish something difficult or to master, manipulateor organize physical objects, human beings or ideas and to do this as rapidly and as independently as possible. Achievement Motivation is based on affective arousal theory of McClellard (1958). This model of motivation is primarily based upon the concept of associative tendencies. Accordingly to the proponents of society, two affective status of the organism serve as important motivators. On of them is negative i.e. fear and anxiety and the other is positive; hope of success or anticipation of rewards. Both of these are learned or conditioned reactions. According to McClelland (1958) a particular motive is nothing more than disposition to strive for a particular type of satisfaction. Hence, the achievement motive is the disposition to strive for satisfaction derivedfrom success in competition with some standard of excellence.Motivation can be defined as the driving force behind all the actions of an individual. The influence of an individual's needs and desires both have a strong impact on the direction of their behaviour. Motivation is based on emotions and achievement related goals. There are different forms of motivation including extrinsic, intrinsic and psychological and achievement motivation. There are also more negative forms of motivation can be defined as the need for success or the attainment of excellence. Individuals will satisfy their needs throughdifferent means, and are driven to succeed for varying reasons both internal and external.Achievement motivation is the attitude to achieve rather than the achievements themselves. It can be consideredas extended person – intrinsic motivation because its reinforcement is delayed. It arises from an interaction within the person. Achievement motivation is "a pattern of planning of actions and of feelings connected with striving to achieve some internalized standard of excellence,as contrasted for example, will power or friendship(Vidler, 1977).

Achievement motivation otherwise known as need for achievement can be defined as a motive to strive for success. Early attempt by McClelland (1950) was made to find out how need for achievement is reflected in societies and how as a societal value it effects the economic and political growth of a nation. He measured the need for achievement with Thematic Apperception Test (T.A.T.). After McClelland his colleagues devised their method of measuring need for achievement.They attempted to find out how those who were low and those who were high in thismotive differed parents who demand that their

children to things on their own at an early age, and do them well are likely to instill the need for achievement(McClelland, 1953). A second factor concerns the use of rewards and punishments by parents. It appears thatindependence training combined with rewards and affection for behaving independently are responsible for instilling the need forachievement in young boys. Thus it can be concluded that individuals with high need for achievement are people interested in excellence for their own sake rather than for the extrinsic rewards. If their personal responsibility affects the outcome, they tend to prefer to control their destinies and make independent judgments based on their own evaluations and experience. They choose challenging goals and prefer delayed larger rewards to immediate smaller rewards.

Understanding the factors that affect achievement is important because motivation affects achievement. Murray (1938) described achievement motivation as the desire to "accomplish something difficult to overcomeobstacles and attain ahigh standard; to excel oneself". Burger (1997) indicated that high-need achieversare moderate risk takers, have an energetic approach to work, and prefer jobs that give them personal responsibilityfor outcomes. It was proposed that parents promoted the need for achievement by providing support andencouragement. However, as Burger (1997) indicated, it is important that parents provide enough support toallow the child to develop a sense of personal competence without robbing the child of independence and initiative. Achievement motivation is the attitude to achieve and it arises from an intersection with in the person according to Vidler (1977), achievement motivation is a pattern of planning of actions and feeling connected with striving to achievers from internalized standard of excellence as contrasted for example will power or friendship. It can be defined as motive to strivefor success.

Parents with more education also have higher expectation for their children's education which facilitates thegreater educational attainment for their children(Alexander, 1997). Well-educated parents are involved more intheir children's education than less educated parents. Such parental involvement in children's education is fruitful. The more actively involved parents are in their children's education, the higher their children's perceptions of competence and better they perform in school and enhance their achievement motivation (Mohanty, 2007).

That is, parents must reward their children's accomplishment, but too much involvement might leave the child with an undermined sense of accomplishment. Parental level of education influences parental involvement and parental support of and educational expectations for their children. In turn, parental involvement and support and expectations for their children influence the adolescent's achievement motivation. School climate is expected to influence teacher expectations for and support of their students (Mishra, 2007 and Mohanty, 2007).

Achievement motivation is a complex area in terms of concept and measurements. However, the studies mentioned above attempted quite reliably to measure its nature, correlates and effects on behaviour. Studies relating to training for enhancing achievement motivation are very rare (Raghava, 1985). It has been firmly established by now that academic achievement is affected by personality variables, curricular variable, and societal variables and so on. Sufficient data are available on the relationship of many of these variables with achievement. It may be noticed that SES, which is a composite of sub-variables like parent's income, father'seducational level, mother's educational level educational facilities available.

But the concept of achievement motivation constitutes an explanation of resourcefulness; urge for achievement, result of the reinforcement of successful performance in activities that are achievement related (McClelland et al., 1953)

A systematic procedure has been followed by reviewing the earlier researches both in India and aboard. The investigator tapped various popular sourceslike Psychological Abstracts, Encyclopedia of

Educational Research (Harris, 1960; Ebel, 1969). Surveys of researches in Education in India (Busch, 1974, 1979, 1987, 1991, 1997) and many other sources like Internet, Eric Data base and many journals and periodicals. The Dissertation Abstract International was used for the review of studies abroad, library studies have been undertaken in NIE; New Delhi, ICSSR; New Delhi, IIE; Pune, CASE; Baroada. The studies presented in this chapter have been arranged in the order of studies dealing with the relationship of achievement motivation and academicachievement, studies dealing with study habits and academic achievement and studies dealing with achievement motivation study habitsand academic achievement. In all the cases studies conducted abroad and in India have been presented separately. The relationship study between study habits and achievement motivation of children of working and non-working women was also presented with a view to highlighting the mother's role in upbringing of children.

Review of Related Literature

Studies showing the relationship between achievement motivation and academic achievement have been presented in the present report putting the abroad studies first and the Indian studies next.Studies conducted abroad : Barker et al. (2008)'s study on effects between Motivational Goals, Academic self-concept and Academic achievement, which is well-established in the literature, however there remains disagreement about the causal ordering of these constructs (b) relations between motivation and academic achievement which show moderate to strong correlation and (c) relation between academic self-concept and motivational indicators which show strong correlations of the studies that combine self-concept and motivation, few examine motivation from a goal perspective the generalized hypotheses attached to this investigation is that variables drawn from self-concept and goal theories taken together will provide a fuller explanation of academic achievement than is possible with either self-concept or motivational goal variables alone. Hence, the purpose of this study was to examine with a longitudinal perspective, the relations between goal theory (mastery, performance and social) academic achievement among seven, eighth and ninth grade students.

Baker, et al. (2010) found relationship between university students' achievement motivation, attitude and academic performance in Malaysia. Student achievement problems are often highlighted in academic literature and the mass media and therefore, it achievements such as achievement motivation and attitude.The purpose of this study was to identify the relationship between the achievement motivation, attitude and student academicperformance. The research design employed was a descriptive correlated. Data were collected by self-reportedquestionnaire on a sample using cluster sampling technique based on the different faculty of students in theuniversity. The respondents were 1484 students from alocal university (1102 females and 382 males). They were following the education, science, humanities, agriculture, technical, engineering programmes. Resultsindicated a positive significant correlation between students attitude towards learning and achievement motivation ($r = 0.53$, $p < .001$) and between students attitude and academic achievement ($r = 0.16$, $< .001$). However, a negative and low correlation ($r=-.38$, $p > .05$) was observed between students achievement motivation (nAch) and their academic achievement.The objectives of the study of Moula (2010) were to investigate the relationship between academicachievement motivation and home environment among standard eighth pupils. The study was carried out on 235 standard eighth Kenyan pupils from six urban and rural primary schools randomly selected from Machakos district. Their age ranged between 13 and 17 years. Two questionnaires, the simple profile (SP) and home environment questionnaire, were used to provide information on the pupils levels of academic motivation and home environment. A significant ($p < 0.05$) positive relationship was found between six of the home environmental factors, that is father's

occupation (r =0.22), mother's occupation (r = 0.26), fathers education (r = 0.15), mothers education (r = 0.14) family six (r = 0.26) and learning facilities athome (r = 0.23) and academic achievement motivation. Parental encouragement was the only factor that was not significantly (r=0.23) related to academic achievement motivation. Although these correlation are low, they showed that pupils motivation to do well in academic work is to same extend dependent on the nature of their home environment. It was recommended that parents need to be aware of the importance of their role in their children's academic achievement motivation so that they can provide the necessary facilities at home.

Moore (2010) using Achievement Motivation theory explain student participation in a residential leadershiplearning community sought to examinestudent motives for participating in a residential leadership community for incomingfreshmen using McClelland's Achievement Motivation Theory (Mclelland, 1958, 1961). Eightynine students began the programme in the fall 2009 semester and were administered a single researcher developed instrument. Responses to an open ended question that asked students what their primary motive forparticipating in thevoluntary residential leadership learning community were analyzed using deductive contentanalysis techniques (Panigrahi, 2005) and categorized according to McClelland's Achievement Motivation theory as the need for affiliation, or any combination thereof. Results demonstrated that while all three needs were found within the responses, the need for achievement and the need for affiliation were more common motives for joining the voluntary, residential leadership learning community.

Areepattamannil, S. (2011) examined (1) the academic self-concept, academic motivation, and academic achievement of Indian immigrant adolescents. In Canada in comparison to their peers in India; (2)The meditational role of academic motivation in the association between academic self-concept and academicachievement among India immigrant adolescents and Indian adolescents, and (3)the perspectives, beliefs and recommendations of Indian immigrant adolescents and Indian adolescents in regard to classroomenvironments/ instructional practices affecting their academic engagement and achievement. Surveys were administered among secondary students in Canada (N=355) and India (N=363) to assess their academic selfconcepts, academic motivation, and academic achievement. Eightfocus group interviews were conducted, four each in Canada and India, to glean the perception and views of Indian immigrant and Indian adolescents.

Descriptive Discriminant Analysis (DDA) revealed that the Indian immigrant adolescents in Canada did notdiffers markedly from their counterparts in India. When non- standardized GPA scores were used, English and overall school GPA sores and verbal self-concept were associated with group separation in DDA. Whenstandardized GPA scores were used, however, verbal self-concept alone was associated GPA scores were used,however, verbal self-concept alone was associated with group separation in DDA. Mediation analysisindicated the mediational role of intrinsic motivation in the association between academic self- concept and academic achievement among Indian immigrant and Indian adolescents.Extrinsic motivation as well mediated the relation between academic self-concept and academic achievement for the Indian immigrant adolescents in Canada. Focus group discussions suggested that the Indian immigrant and Indian adolescents were primarily extensively motivated toward schools and academics. Further, both the Indian immigrant and Indian adolescentsperceived their classroom teachers as controlling rather than autonomy - supportive.Quarisy and Turki (2011) study aims to determine the levels and relationship of creativity, self-concept and achievement motivation of adolescents. Among a sample of 800 adolescents in the age group of 16-18 years studying in the 10th, 11th, and 12th standards in the higher secondary schools of both private and state syllabus in the geographical area of Ammon city are selected as a randomized cluster sample of the study from the population. The results indicate that self-concept and achievement motivation of high creative male and female adolescents is less that the low creative male and female adolescents is less than the average and

is greater than the high creative male and female adolescents. Additionally, the results indicate that achievement motivation of the high self-concept of the male and female adolescents is greater than the average self-concept and is greater than the low self-concept. It also indicate that the achievement motivation of low average and high selfconcept of private syllabus and state syllabus adolescent that the achievement motivation of the higher self concept. Total adolescents is less than the average self-concept and isgreater than the low self-concept andthe correlation between the creativity withtheir physical self, social self, temperament self, educational self, moral self, intellectual self and total self-concept of sub-samples are not significant.

Studies conducted in India

A lot of studies were conducted in India in relation to achievement motivation since long. In this respect attempts were made to determine the factors related to achievement, where achievement motivation was found out to be a predictor. Studies of Ghuman (1976), Abrol (1977), Gupta (1978), Narula (1979), Jerath (1979), Zargar (1980), Singh (1981), Gandhi (1982), Chaterji (1983), Chauhan (1984), were completely in the line of assessing relationship betweenachievement motivation and academic achievement in relation to certain other moderator variables like sex, intelligence SES etc. These research studies were not covered under this study owing to the older researches. However, reviews of research studies conducted after 1985, have been mentioned in the present research report for its novelty and recency They were described in the following pages. Adsul and Kamble (2008)'s study was carried out to investigate the effects ofgender, economic background and caste differences on achievement motivation possessed by college students on the basis of societal transformation. An exploratory method of research was employed by adopting 2x3x4 factorial designs. The study was based on one hundred and ninety-two under graduate students of various colleges from Sangli city of Maharashtra, was selected by random sampling procedure. As per research plan 48 subjects from each castegroup i.e. forward castes, other backward castes, scheduled castes and Nomadic tribes were selected onthe basis of male-female ratio was 1:1, and three levels of economic background of family. Achievement Motivation Test (ACMT) developed by Bhargava was used to collect the data from the sample. 't' test, Duncan's Multiple Range test and three ways ANOVA were circulated for deriving the results. The result showed that there is a significant difference between scheduled caste and Nomadic tribes, scheduled caste and other backward caste students and in between male and female students. Forward caste and scheduled caste group students having an average levelachievement motivation. As well as male students having a high achievement motivation while female studentshaving below average level of achievement motivation. The most important finding is that the computed 'F' ratio of interaction was found to be not significant which indicates the caste, gender and economic background of family does not jointly affect on achievement motivation of college students.

Sharma's (2009) study attempted to (i) identify different levels of creativity,Achievement Motivation, self-concept, Index of Brightness of adjustment amongadolescent, (ii) Study the contribution of creativity, Achievement motivation, self- concept, index of brightness and adjustment, (iii) Study the interaction creativity, Achievement motivation, self-concept, index of brightness and adjustment and its effect on academic achievement of adolescents and (iv) Study the relationship between all the variable (including academic achievement). It was primarily a co- relational study. In the study academic achievement was dependent variables and creativity, Achievement motivation, self-concept and adjustment were independent variables and index of brightness being on interacting variable. The study followed the 2x2x2, 2x2x5 and 2x5x5 functional designs. The related null hypotheses were formulated. To accomplish the objectives the data was collected through sample of 770 students of government schools of West Delhi in the age group of 14-15 years, using the Bager Mehdi's Tests of creative

thinking, Deo-Mohan's Achievement motivation (D-ACM) scale Pandey's adolescent adjustment analyzer, Pratibha Deo'sself-concept scale Mohsin's general intelligence test and school cumulative records. The data so collected was quantitatively analyzed through statistical techniques of ANOVA: Regression Analysis, Pearson's Product Moment Co-efficient of correlation and F-test. The different levels of all independent variables were found and by taking three variables at a time, it was found that (i) there is no significant interaction effect of creativity, Achievement motivation, self-concept, index of Brightness and adjustment on mean performance of academic Achievement of adolescents, (ii) There was significant contribution of creativity, achievement motivation and index of brightness in predicting academic achievement.

Chhetri (2012) conducted a study on self-concept and Achievement Motivation of Adolescents and their relationship with Academic Achievement over a sample of 480 boys and girls of class X from various Government and non- Government schools within the age range of 14-16 years from urban and rural areas of Sikkim state. The findings of the study concluded that with regard to gender and locale variations, there was no significant difference in the adolescents but there wassignificant relationship between achievement motivationand academic achievement

Rationale of the study

The concern for the excellence in Education is as old as the man himself. The central focus of all formal educational effort is on academic achievement of the learners. Quality of performance has become the key factor for personal progress. A growing concern is developing in the parents for academic excellence of theirchildren.But owing to modern civilization and parents' engagement for earning more money, maximum parents are interested in employment. These makes the women preferring work at home and serve in the organization. Therefore, the mothers find no time to cater to the needs and requirements of their children and children are deprived of parental involvement in their studies as well as their emotional and social development. In this connection, the following question arise.

1. Is Achievement Motivation necessarily required for academic achievement?
2. Is the level of achievement motivation same in case of boys and girls?
3. Is achievement motivation level different in boys and girls due to different school interventions?
4. Is different levels of achievement motivation (high, Average and low) in secondary school boys and girls a responsible factor for discriminating them in their levels of achievement?

Answers to the above questions led the investigator to investigate and to show the comparative effectiveness of working and non-working status of mothers and its impact upon the non-cognitive correlates to academic achievement.

The major findings of the reviews also purport the same viewpoint that academic achievement is a function of both cognitive and non-cognitive variables But different research studies have been conducted to assess the contributions different non-cognitive and cognitive variables in proportion variance in different magnitude. The present study was a sincere attempt of the investigator to determine in what proportion and directionachievement motivation is accountable to the scholastic achievement of the secondary school boys and girls.

Statement of the Problem

On the basis of the arguments stated above the study was entitled as Achievement Motivation influencing Academic Achievement of Secondary School tudents in relation variations in gender and school interventions.

Objectives

1. To study the relationship between achievement motivation, and academic achievement of secondary school boys and girls.
2. To study the impact of different levels of achievement motivation (High, Average and Low) in discriminating boys and girls in their levels of academic achievement.
3. To study the gender differences in levels of achievement motivation.
4. To study the level of achievement motivation in secondary school boys and girls due to the variations in school interventions.

Formulation of Hypotheses

The hypotheses were formulated in reference to the objectives in null form for ease of verification.

Ho1: There are no significant differences in the achievement motivation of boys and girls of secondary schools.

Ho2: There is no significant difference in the achievement motivation of boys and girls of secondary schools due to different school interventions. In the present study, academic achievement referred to the total marks obtained by the students in the final pre board examination of Class IX in terms of percentages. School interventions referred to the schools in terms of Public schools which also included Missionary schools and Govt schools of the state.

Ho3: There is no significant difference in the academic achievement of boys and girls of secondary schools.

Ho4: There is no significant difference in the academic achievement of boys and girls of secondary schools due to the school interventions.

Ho5: There is no significant relationship between achievement motivation and academic achievement of boys and girls of secondary schools.

Ho6: There are no significant differences in the academic achievement of boys and girls due to high, average and low levels of achievement motivation.

Achievement Motivation here refers to the tendency to strive for success in competition against some standard of excellence as per the definition given by McClelland (1961). In the present study the achievement motivation was considered as a multidimensional attribute which are indicated by persistence, personal responsibility, realistic goal orientation, achievement satisfaction and recognition behaviour. It has been measured as per the scale developed by Mehta (1967) whichis a Thematic Apperception Test (TAT).This scale was restandardised over a sample of 300 school boys and girls drawn from different school interventions by random sampling procedure in Balasore district by the investigator herself in 2016 and norms were set.

Academic Achievement refers to the level of achievement in various subjectsas indicated by marks or grade points. It refers to the behavioural change which occurs in the individual due to learning. It means the attained level of students functioning in school task such as languages, mathematics, sciences, social sciences etc.

Significance of the Study

The importance of the present study could hardly be over emphasized. Though life success is not synonymous with school success, success in the school is the yardstick for majority of children for their future life. A need was felt therefore, to explore this domain empirically and specify the role of achievement motivation, on academic achievement. These affective variables have recently been identified as influential factors. Such a study was assumed to analyse the innerforces underlying the achievement of high school students along with providing a framework for the conceptualization of an academic motivation theory.

Besides this, the findings can be of great practical value as they may help in reconstructing the society in

the present form of social order. Because it may help parents in creating favourable conditions for scholastic growth of students.

The study was also justified for another reason. Because of the present trends in family structure and environment in the technological world achievement motivation is given due importance in homes is a crucial factor. People are hankering after collecting easy money from the market and present generation boys and girls are swayed away by falsehood, cyber crimes etc. Therefore academic achievement has been a dream by the present generation of boys and girls. In that context the study is a befitting one.

Delimitations of the Study

The study was confined to the schools located under Balasore MunicipalCorporation. Public Schools,(Missionary schools) and State govt schools were considered to fulfill the school interventions. Two schools from each type were selected to have the sample due to gender and school interventions variationsAs per the provisions made by Government, there was no private Odiamedium high school. So it was not considered

Method of Study

The purpose of the study was to find out the relationship between the two variables of achievement motivation and academic achievement. The study design was a normative study design of ex post facto nature.The selection of subjects was done from Class X of secondary schools of Balasore district. For this information about the total number of schools, strength in class X, total number of sections in each school was obtained.

Then a purposive sample pool of 400 students studying in 6 secondary schools of different interventions like only Boys, only Girls and Co-ed schools, Public schools and State govt schools was selected for the study. In order to make the sample homogenous a sample of 300 class X students were picked up of age group 14-16 years. Out of 400 students selected as sample for the study, care was taken to select the students of same SES and intelligence level for which an intelligence test was administered and the educational, occupational and income status score of the parents was measured and fixed within the score range of 15-17 (SES Scale of Nayak, 2004). Thus the sample was reduced to 300.

Total Boys-146 Total Girls-154, Public schools students-130, State govt school students-170,Boys of Public schools-60,State govt schools-86, Girls of Public schools were-70, and girls of State govt schools-84

In the present study, the relationship of Achievement Motivation, on Academic Achievement of Children was studied in relation gender and school intervention variations. So independent variable was Achievement Motivation, and the dependent variable was Academic Achievement.

As the dependent variable was believed to be largely affected by the intelligence of the students and socioeconomic status of the parents, both were considered as the control variables.

The following tools were used in the study

Achievement Motivation Inventory of Mehta (1969) for measuring Achievement Motivation.

SES scale of Nayak (2005) and a Verbal Test of Intelligence of Ojha and Roychaudhary(2005) also were used for selection of the sample.

The academic achievement scores were collected from the school tabulation registers which were later converted to percentages for measuring academic achievement.

The techniques of data analysis include, 't'- ratio, for measuring test of significance between two contrasts, 'r' for relationship between the variables and ANOVA for differential analysis study were used.

The Findings of the Study

Findings relating to Descriptive analysis of the variables

The descriptive measures on the scales of the study were calculated from the frequency distributions in order to verify the hypotheses.

The Mean, Median, SD, Q3, Q1, P10 and P90 were then calculated of all the subsamples as well as in all the scales. The details of these on each scale were then systematically presented for verification of hypotheses. In case of achievement motivation, it was revealed that the mean scores of boys and girls of Public

Schools were different, girls exceeding the score mark of boys.. The nature of the frequency curve drawn on this basis was studied from normality point of view and it was observed that the skewness and kurtosis of the curve drawn in case of achievement motivation of respondents of Public schools and State govt schools were 0.05 and 0.221 respectively. The skewness and kurtosis of respondents of gender variations were 0.250 and .05 respectively. The measures of skewness and kurtosis indicated that the distribution of scores have been appropriate to warrant theuse of statistical tests. The normal value of skewness and kurtosis being 0 and 0.263respectively, it was observed that the achievement motivation scores of the respondents tended to be distributed normally even though slight skewness and lephokurtic nature of the curves were observed. The scores obtained by the students on achievement motivation inventory were analysed in respect of high, average and low scores. The cut-off point for high scoring was considered to be the Q3 of the distribution and low scoring Q1 and in between Q1 and Q3 scores were grouped as average scores . As such the respondents scoring above Q3 point on the AMI were grouped under high group, students scoring below Q1 point were the low scoring groups. The sample was then categorized under high, average and low groups as per the variables of the study.The percentage of boys and girls of high category were29 and 40 percent respectively, the girls had shown better result compared to the boys. When the boys and girls of Public schools and state govt schools were compared, it was observed that the percentage of high achievement motivation group was more,(33and 56%) compared to the children of state govt schools(26 and 26%) but in average group state govt.school children were in a larger percentage. In case of academic achievement, it was observed that the students of Public schools had comparatively higher scores compared to the students of state govt scools. In average, the girls had better achievement scores compared to the boys. This might have been due to the fact that the parents of Public schools might have engaged private tuitions for their children because of higher economic subsistence which the parents of state govt schools could not. The fact that girls outclassing boys, wasa common factor in the present scenario. It was in all parts of the nation and everywhere it was observed that the girls do well and better than the boys because of theirown sense of responsibility. As the sample was drawn from the same intelligence and socio-economic status level, the result in favour of girls was the indication of the intellectual achievement responsibility displayed bythe girls.

Gender Differences in all the Variables

The present study being intended to find out the significant difference betweenboys and girls of Public and State govt schools could not be established as the 't' ratio was not significant. Therefore, the null hypothesis could not be rejected. Theresult obtained revealed that irrespective of school intervention variation, there is no influence of this on the level of achievement motivation of adolescent boys and girls.

In order to find out significance of differences in academic achievement of boys and girls of Public and State govt schools the't' ratio was calculated in each contrast. It was concluded that academic achievement wise there was no difference in the boys and girls, but there was significant difference in

in total students of Public and State govt schools. The‘t’ ratio was also significant in case of boys of Public schools and boys of state govt schools.. Even though the meandifferences existed in between boys and girls of Public and State govt schools, the same were not significant. Hence, the null hypothesis formulated as, there is no significant difference in academic achievement of respondents of Public and State govt schools was not rejected, yet subsample wise that difference could not be established. Only in case of boys of Public Schools and State govt schools, it showed significant difference.

Studies of Shaw (2011), Kaur et al. (2009) showed significant differences in academic achievement in case of boys and girls of public and state govt schools. Khanna (2011) in a study attributed this difference due to higher level of emotional intelligence Akhani et al. (1999) showed that material employment had no interfering effect on achievement. Studies of Chaturvedi (1996) and Guha et al. (1995) revealed that maternal role perception was related to achievement. They further substantiated that the adolescents of professional and non-professional mothers differed in material role perception and achievement. Adolescents getting parental discipline with a focus on induction were reported to have higher level of academic achievement. In tune with these studies, theinvestigator desired to conclude that Public schools have exerted discipline and hence the adolescents were goodin achievement.

Relationship Study

One of the objectives of the study was to assess the relationship amongachievement motivation, and academic achievement of adolescents of different school interventions. Therefore, attempts were made to compute the correlation coefficients between the variables separately and totally. All were tested for significance and interpretation was made as per the results. It was observed that the relationship between achievement motivation and academic achievement of all the three groups of high, average and low were, 0.445, 0.889 and 0.528 respectively. All were highly significant at 0.01 level. Further, it was observed that the co-efficient of correlations between achievement motivation, and academic achievement in all the three groups were highly significant (0.01 level of significance). This revealed that as the achievement motivation increases in the respondents,; the academic achievement also gets increased. Therefore, the null hypothesis stated earlier that there is no significant relationship in achievement motivation and academic achievement were rejected. The results showing significant positive relationship between achievement motivation and academic achievement seemed to be self evident as students who wanted to perform better and strive for success in competition are most likely to obtain high marks in their school examinations. On the contrary, those who lack persistence are scared of competitions and do not want to achieve high are likely to get low marks in examinations.

The trend here observed could have been due to the absence of respondents in the sample at the lower end of the achievement motive battery and the sample were selected from among the same I.Q. level of students. As intelligence is the most potent factor affecting academic achievement, there was the highestrelationship co efficient. Because greater intellectual capacities were in favour of the intensification of desire to achieve and high achievement motive contributed to the expression of using intelligence in the form of accomplishment (Mehta, 1969, Desai,1970).

Further, when the nature of achievement motive was considered, the result obtained in the present study was considered appropriate. Because studies have earlier shown that those high on achievement motive set moderately difficult goals for themselves, get highly interested in concrete feedback, assume personal responsibility and generally show more initiative and explanatory behaviour (McClellard & Winter, 1969), further oriented and action minded (Weiner, 1970). All these characteristics evinced a formidable combination of practical, venturesome and determined personality which can achieve brilliant results in the sphere of academics. A student possessing these characteristics would certainly

learn rigorously and ultimately prove to be a better examination achiever. This was evinced from the studies of Nayak (2005), Mishra (2007) and Chhetri (2012). In these studies, individuals high on achievement motive were seen as confident of success.

The zero-order correlations between study habit and academic achievement of the respondents of Public and State govt schools were highly significant. This revealed the fact that the students with high achievement motive being realistic in their approaches, enthusiastic and persistent must have worked hard for more marks.. The findings were in conformity with earlier researches of Jagannathan (1985), Gupta (1987), Mohanty (1999), and Sahoo (2001), Kumar and Mohapatra (2008), Chhetri (2009).

Differential Analysis of the variable on Academic Achievement. This was done in an ANOVA. It was revealed that the main effect of achievement motivation on academic achievement was highly significant.

The students were split into three distrinct groups of high, average and low. Thus a 2×2 factorial design was employed for the analysis with the achievement scores inserted into the cells and the data were then computerized. The final results along with the sum of squares, 'F' values and their significance levels were calculated.

The main effect of achievement motive showing an 'F' value of (202.409) in case of Public schools children was very high. This gave an added confidence to the researcher in interpreting that high, average and low achievement motive groups of adolescents differ significantly from each other. It meant that the achievement marks of the respondents were dependent upon the three levels of achievement motivation. Therefore, the hypothesis (H05) that there is no significant difference in the academic achievement of high, average and low levels of achievement motivation scores was rejected.

In case of State govt run schools the ANOVA was also calculated. Theresults revealed that the main effect of achievement motivation on academic achievement of respondents of State govt schools was highly significant, the F value being 239.659. This gave an added confidence in interpreting that the mean academic achievement of high, average and low achievement motivation groups of students averaged over three levels of achievement motivation differed significantly from each other. It meant that the marks in academic achievement are dependent on the differences or effect of achievement motive. Thus the hypothesis of no significant difference in the academic achievement of high, average and low levels of achievement scores of the respondents of state govt schools also stands rejected.

Educational Implications

Development of achievement motivation - One of the most important psychosocial variables of this study which is responsible more than that ofthe other variables -self concept in determining the level of academic achievement is achievement motivation. From the present study it has been found that achievement has a perfect positive relationship with academic achievement. So in order to raise the academic achievement of the students itis essential to develop their achievement motivation .Therefore the situations in the home and in school should promote the need achievement of the pupil.In the context of the result in the present investigation the followingrecommendations have been made.

Emphasis on intellectual pursuit - Need achievement can be raised if the students develop their level of intelligence. Level of intelligence can be raised by encouraging the students to develop the problem solving ability, thinking, reasoning etc. by participation in different activities and studying the creative work of different persons. So far the development of achievement motivation among the students the intellectual development should be promoted. The school should organise different curricular and co curricular activities, like seminars, talks delivered by the intellectuals, debates, discussions etc. and should also promote students to gain correct and current information by studying the magazines, newspapers, journals, periodicals. It should encourage the students to study the creative writings of the

the eminent scholars. Not only the whole responsibility goes to the school and teachers for promoting achievement motivation but also the home, parents, elders, neighbours share a lot. Parents should also give the answersto each of the questions of their children with a great patience. They
should maintain home atmosphere proper for the children's intellectual pursuit.

Affectionate parental behaviour - Achievement motivation is also influenced by the parental behaviour.Parents should be affectionate enough. They should listen and understand all the queries, problems andneeds oftheir children and should try to solve them. They should encourage the children to meet each and every problem of their life. But they should not be over affectionate which may spoil their children.Self actualization - Pupil of high self actualization are directed more by internal than external self-concept compared to that of those of low self actualisation. Pupil of high self actualization are more flexible and less rigid and do not depend upon seeking approval from others, more capable of accepting themselves and others and the world around them.

Permissiveness of parents - Parents should be permissive. They should encourage the children to know, to gain information by participating indifferent life situations. They should encourage them to be flexible, fearless and perceive the correct knowledge only after scientific and objective investigation.

Development of level of aspiration - Pupils should have high level of aspiration. High level of aspiration is responsible for developing high need achievement. The teacher and the parents should set high goals before the students so that they should try to achieve them and they should develop the tendency to achieve more and more. But care must be taken that the goals should be set up by keeping an eye to the age, gender, intellectual standard and habitational variable or else it will have negative impact upon the children and may block their achievement.

Reducing frustration reactions - Need achievement is also hampered by frustration. Frustration results from repeated failure in any activities. The process of blocking or thwarting needs causes frustration in human beings. Ifthe children repeatedly fail in any activities they develop frustration reactions, which block their motive to achieve. So the children should be encouraged to develop their patience and to continue the activity until the success is achieved.

Removal of prejudices and biases - Conservative attitudes, prejudices attached to different situations and Objects are responsible in reducing the achievement motivation. The attitude of the people attached with theresistance of girls education, caste system, child marriages, preconceived ideas about the quantity and quality of education often cause to reduce the achievement motivation in students. So care must be taken to free the societyfrom these prejudices and biases.

Level of concept acquisition is to be highlighted - Teacher should make the concept clear before the students for which they are striving. Pupil shouldknow about the problem and prospects of the concept, the idea so that they should try in different ways to achieve the same. So far the development of achievement motivation the level of concept acquisition is to be highlighted.

Better scope for training for enhancing achievement motivation - Achievement motivation can also be enhanced by properly planned training programme. Workshop training, refresher courses, in service training coursesshould be provided for the teachers to help them to equip with necessary skills and competencies to enhance student's achievement motivation.

Development of socio-cultural status - Socio cultural status also influences the achievement motivation of the students. Different society and cultural groups have their own goal, standard or criterion. The pupil from these groups represent their society and culture and try to achieve and stick to theirown goal, standard of criterion. So if the socio cultural status can improved the achievement motivation of the pupil can also be improved. Over and above, for higher achievement motivation the meaningful, joyful experience in the educational level will lead to greater satisfaction and the greater utility value of the system of education will develop the strongest base for achievement motivation.

the meaningful, joyful experience in the educational level will lead to greater satisfaction and the greater utility value of the system of education will develop the strongest base for achievement motivation. Hence need specific and utility specific educational system will very highly be appreciated. The system and method of curriculum having more scope for job opportunities will also be the great source for developing need to achieve motive in students.

Suggestions for Further Research

The study was concerned with school academic achievement of secondary school students but all the aspects considered as correlates to academic achievement could not be concerned due to some limitation in investigation. Therefore some valuable recommendation is recommended for further research.

Prediction of school achievement: A study pertaining to this could be conducted to elaborate same of the other correlates like cognitive style offunctioning, psycho social constraints, creativity, school and home environment, socio- economic factors and other psycho sociological factors like anxiety, intelligence, parental attitude, educational aspiration, study habits, locus of control etc. could be considered in respect of their predicting variables to the criterion of academic achievement.

Development of standardized tool: Further researches may be conducted to develop standardized school achievement tests in view of course and curriculum at a particular level for better appraisal instead of considering schoolexamination marks as the criterion measure of academic achievement.

Wider implication of the study: For wider implication of the study further studies could be taken, taking other strata of the population besides gender, locale and management and larger sample of representative nature coveringmore districts and large number of students.

Development of norms: Ample scope for further researches are recommended to modify and re-standardized the tools including more dimensions, items and more developed psychometric techniques and norms could be developed for the following tools.

Comparative studies might be conducted on Secondary school stream reading under different board, CBSE, ICSE, Madrassa boards, State Boards of Examination. Researches of interaction nature: Researches concerning the interaction effects of the variables along with other attribute variables could be conducted tomagnify the prediction studies with regression analysis where by individual components wise prediction to the criterion measure could be assessed.

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DESIGN OF A SEPIC CONVERTER TO POWER AN INDUCTION MOTOR

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ABSTRACT

This paper presents the design of a SEPIC (Single-Ended Primary Inductor Converter) converter for powering an induction motor. The objective is to develop an efficient and reliable power supply system that meets the specific requirements of the motor. The design focuses on key aspects such as power requirement determination, voltage regulation, input power factor correction, control and protection mechanisms, efficiency optimization, compactness, cost-effectiveness, and compliance with standards and regulations.The power requirement is calculated based on the motor's rated power and efficiency specifications, ensuring adequate power output. Voltage regulation is achieved to maintain a stable and regulated output voltage, which is essential for optimal motor performance. Power factor correction techniques are employed to improve overall efficiency and reduce harmonics injected into the power grid.The design incorporates a control strategy that enables smooth and reliable motor operation. Protection mechanisms are implemented to safeguard the motor and converter against overvoltage, overcurrent, and other fault conditions, enhancing system reliability. Efficiency optimization techniques, including component selection, loss minimization, and control algorithm optimization, are employed to achieve high efficiency throughout the operating range.The design also considers compactness and cost-effectiveness by selecting suitable components, managing thermal dissipation, and optimizing the layout. Compliance with electrical and safety standards is ensured to guarantee safe and reliable operation.The designed SEPIC converter system is validated through simulations and prototyping, followed by comprehensive testing to verify performance, efficiency, and reliability. The results demonstrate the successful implementation of the converter, providing a stable and efficient power supply to the induction motor, thereby enabling optimal motor performance in various applications

Introduction

Induction motors are used in many drives because they are simple and very easy to maintain. Speed of an induction motor is related to its frequency. So speed can be easily by using converters which gives variable frequency output. An inverter is a type of power converter which converts dc ac power. Thus inverter is used in the areas where ac power is required. But practical inverters give non sinusoidal output waveform. Usually they contain harmonics. The harmonics can be eliminated with pulse width modulation. By using some modulation we can obtain the required amplitude and frequency with good quality outputs. Control of an induction motor(V/F) is become easy by using pulse width modulation.

By using some modulation we can obtain the required amplitude and frequency with good quality outputs. Control of an induction motor(V/F) is become easy by using pulse width modulation. PWM is a simple method which used for controlling output of inverter. By adjusting the ON time and OFF time of inverter switches, a required ac output voltage is obtained. So PWM helps in reducing total harmonic distortion. Three phase power converters using pulse width modulation have a wide range of applications for ac machine drives. It is understood that induction motor is going to become the main part of industrial purposes. As compared to the DC machine, it has a better power by mass ratio, simpler maintenance and low cost. However, the process of controlling of the induction is more difficult. Advantage of using a ac-dc-ac system to drive AC motor in place of simply plugging into power is that ,it allows better speed control. A available method of power converter circuit to obtain the three phase variable voltage and frequency output from single phase supply is a full bridge diode rectifier and three phase inverter system. This circuit is of simple structure and low cost. But it has more current distortion and poor power factor. whenever the power requirement in the the low power range low cost drive is relevant. The circuit proposed in this work has a modified SEPIC rectifier plus three phase inverter, with this structure source current can be controlled to be sinusoidal with unity power factor. The variable inverter drive in this work used to replace existing capacitor connected motor connection. The capacitor is disconnected and the terminals of the main and auxiliary windings will fed to the inverter in this work.

OBJECTIVE

The objective for designing a SEPIC converter to power an induction motor can be stated as follows:
Design an efficient and reliable SEPIC (Single-Ended Primary Inductor Converter) converter system to provide the necessary power supply to an induction motor, while meeting the following requirements:

Power Requirement: Determine and provide the required power output to the induction motor based on its rated power and efficiency specifications.
Voltage Regulation: Ensure a stable and regulated output voltage to match the motor's operational requirements and prevent any detrimental effects on its performance.
Input Power Factor Correction: Implement power factor correction techniques to improve the overall efficiency of the system and reduce the harmonic content injected into the power grid.
Control and Protection: Develop a control strategy for the SEPIC converter that enables smooth and reliable motor operation. Implement protection mechanisms to safeguard the motor and converter against overvoltage, overcurrent, and other fault conditions.
Compact and Cost-Effective Design: Design the SEPIC converter system to be compact, lightweight, and cost-effective, considering factors such as component selection, thermal management, and layout optimization.
Compliance with Standards and Regulations: Ensure that the design complies with relevant electrical and safety standards, such as IEC standards or local regulations, to ensure safe and reliable operation.
Validation and Testing: Validate the designed SEPIC converter system through simulations and prototyping, and perform comprehensive testing to verify its performance, efficiency, and reliability.

By achieving these objectives, the designed SEPIC converter will provide a stable and efficient power supply to the induction motor, enabling optimal motor performance and reliability in various applications.

HARDWARE REQUIREMENT

SEPIC Converter

The single ended primary inductance converter (SEPIC) is a DC-DC converter topology that provides a positive regulated output voltage from an input voltage that varies from above to below the output voltage. The advantage is output voltage not inverted and it is similarly to the buck boost converter. The SEPIC can be controlled by the duty cycle of the switch. They consists of two inductor are coupled together and electrically displaced them. The SEPIC exchanges energy between the capacitors and inductors in order to convert from one voltage to another. The amount of energy exchanged is controlled by switch S1, which is typically a transistor such as a MOSFET, MOSFETs offer much higher input impedance and lower voltage drop than bipolar junction transistors (BJTs), and do not require biasing resistors as MOSFET switching is controlled by differences in voltage rather than a current, as with BJTs.

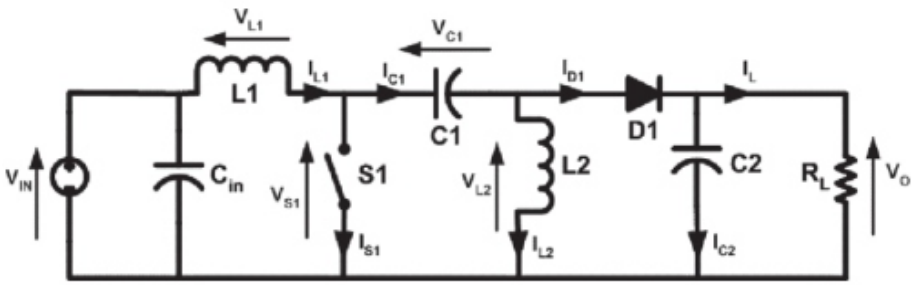


Fig : SEPIC Converter Circuit Diagram

All dc-dc converters operate by rapidly turning on and off a MOSFET, generally with a high frequency pulse. What the converter does as a result of this is what makes the SEPIC converter superior. For the SEPIC, when the pulse is high the MOSFET is on, inductor1 is charged by the input voltage and inductor2 is charged by capacitor-1. The diode is off and the output is maintained by capacitor-2. When the pulse is low the MOSFET is off, the inductors output through the diode to the load and the capacitors are charged.

The greater the percentage of time (duty cycle) the pulse is low, the greater the output will be. This is because the longer the inductors charge, the greater their voltage will be. However, if the pulse lasts too long, the capacitors will not be able to charge and the converter will fail to shutdown.

Modified SEPIC Converter

The modified SEPIC converter without magnetic coupling can operate with the double of the static gain of the classical boost converter for a high duty-cycle operation. However, a very high static gain is necessary in some applications. A practical limitation for the modified SEPIC Converter in order to maintain the converter performance is a duty cycle close to D=0.85, resulting in a maximum static gain equal to q=12.3. A simple solution to elevate the static gain without increases the duty cycle and the switch voltage is to include a secondary winding in the L2 inductor. The L2 inductor operation is similar to a buck–boost inductor and a secondary winding can increases the output voltage by the inductor windings turns ratio (n), operating as a fly back transformer.

In this converter structure presents the problem of over voltage eat the output diode Do due to the existence of the coupling winding L2 leakage inductance. The energy stored in the leakage inductance, due to the reverse recovery current of the output diode, results in voltage ring and high reverse voltage at the diode Do. This overvoltage is not easily controlled with classical snubbers or dissipative clamping. A simple solution for this problem is the inclusion of a voltage multiplier at the secondary side. This voltage multiplierincreases the converter static gain, the voltage across the output. First operation stage diode is reduced to a value lower than the output voltage and the energy stored in the leakage inductance is transferred to the output. Therefore, the secondary voltage multiplier composed by the diode DM2 and capacitor CS2 is also a non-dissipative clamping circuit for the output diode.

The magnetic coupling is accomplished with the input inductor in the boost-based solutions, the input current ripple is significantly increased and depends on the inductor winding turns ratio. Increasing the inductor turns ratio and the static gain, the input current ripple rises. The input current ripple increment is a non-desirable operation characteristic for some applications as the fuel cell power source. As the magnetic coupling is not accomplished with the input inductor in the proposed topology, the input current ripple is low and is not changed by the magnetic coupling. There are also some proposed solutions based on integration of the SEPIC converter with boost and fly back DC–DC converters.

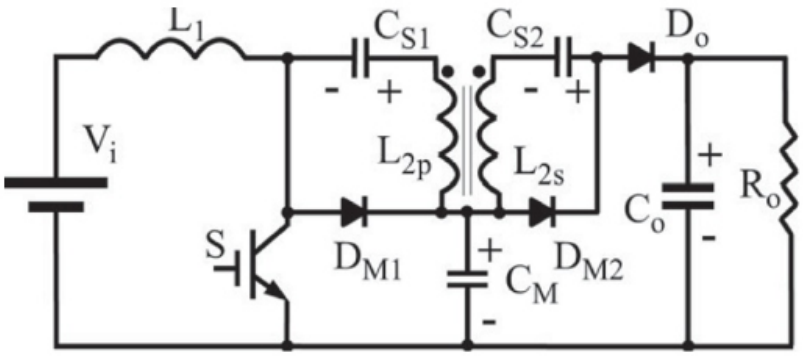


Fig- Modified SEPIC converter circuit diagram

However, the proposed topology presents pulsating input current, and the active clamp technique increases the converter complexity with an additional controlled switch and command circuit. The integration of the boost converter with a SEPIC converter is also proposed in some applications for high static gain. Some operation characteristics of this converter are similar to the circuit with magnetic coupling proposed. The main differences of the proposed converter with respect the previous topology are the ZCS switch turn-on obtained with a resonant operation stage, reducing the commutation losses even in the operation with light load and a higher static gain considering the same transformer turns ratio, reducing the converter duty cycle and the switch voltage.

The integration of the boost converter with a SEPIC converter is also proposed. Some operation characteristics of this converter are similar to the circuit with magnetic coupling proposed in this paper. The main differences of the proposed converter with respect the previous topology are the ZCS switch turn-on obtained with a resonant operation stage, reducing the commutation losses even in the operation with light load and a higher static gain considering the same transformer turns ratio, reducing the converter duty cycle and the switch voltage.

DRIVER CIRCUIT

The driver circuit is used to amplify the pulses. The driver circuit forms the most important part of the hardware unit because it acts as the backbone of the inverter AS it gives the triggering pulse to the switches in the proper sequence.

INVERTER

A device that converts DC power into AC power at desired output voltage and frequency is called an Inverter. Phase controlled converters when operated in the inverter mode are called line commutated inverters. But line commutated inverters require at the output terminals an existing AC supply which is used for their commutation. This means that line commutated inverters can't function as isolated AC voltage sources or as variable frequency generators with DC power at the input.

Therefore, voltage level, frequency and waveform on the AC side of the line commutated inverters can't be changed. On the other hand, force commutated inverters provide an independent AC output voltage of adjustable voltage and adjustable frequency and have therefore much wider application.

INDUCTION MOTOR

An induction motor is a type of AC electric motor that operates on the principle of electromagnetic induction. It is one of the most widely used electric motors due to its low cost, durability, and simplicity of design. Induction motors are commonly used in various industrial, commercial, and residential applications, such as pumps, fans, compressors, conveyors, and household appliances.

The basic structure of an induction motor includes a stator, a rotor, and an air gap between them. The stator consists of a cylindrical iron core with slots, which are evenly distributed around the circumference of the core. The slots are filled with insulated copper wire coils that are wound in a specific pattern to create a magnetic field. The rotor, on the other hand, is a rotating iron core that is placed inside the stator and separated from it by a small air gap.

When an AC voltage is applied to the stator, it creates a rotating magnetic field that interacts with the rotor. The magnetic field induces a current in the rotor, which creates a second magnetic field. The interaction between the two magnetic fields produces a torque on the rotor, causing it to rotate.

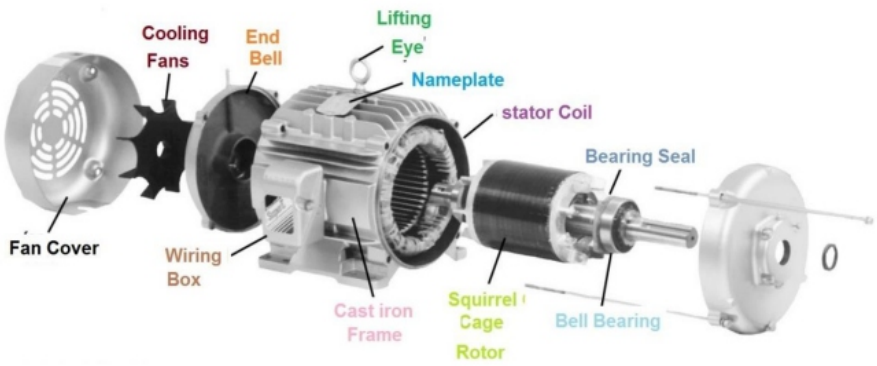


Fig : Induction motor parts

Induction motors are classified into two main types: single-phase and three-phase. Single-phase induction motors are used for low-power applications, such as fans and pumps, whereas three-phase induction motors are used for high-power applications, such as industrial machinery.

The speed of an induction motor is determined by the number of poles in the stator and the frequency of the AC voltage. The synchronous speed of an induction motor is given by the equation:

Synchronous speed = (120 x frequency) / number of poles The actual speed of an induction motor is slightly less than the synchronous speed due to the "slip" of the rotor. Slip is the difference between the synchronous speed and the actual speed of the rotor.

Induction motors are known for their reliability, low maintenance, and high efficiency. They do not require any brushes or commutators, which reduces the need for maintenance. However, they are not suitable for applications that require precise speed control, such as robotics and CNC machines, as their speed is determined by the AC voltage frequency.

POWER SUPPLY UNIT

As we all know any invention of latest technology cannot be activated without the source of power. So it this fast moving world we deliberately need a proper power source which will be apt for a particular requirement. All the electronic components starting from diode to Intel IC's only work with a DC supply ranging from -+5v to 0-+12v. We are utilizing for the same, the cheapest and commonly available energy ource of 230v-50Hz and stepping down, rectifying, filtering and regulating the voltage. This will be dealt briefly in the forth-coming sections.

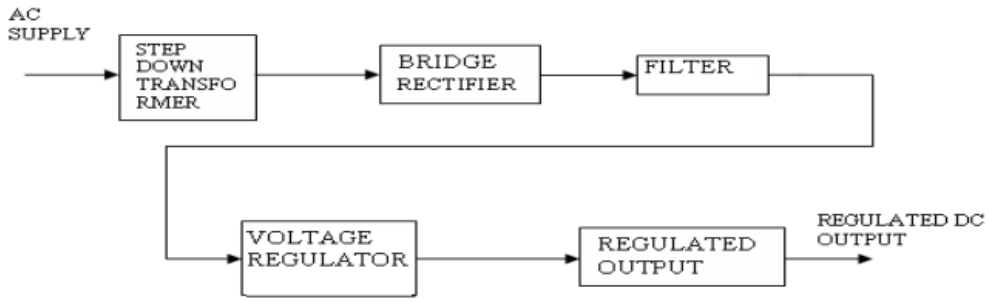
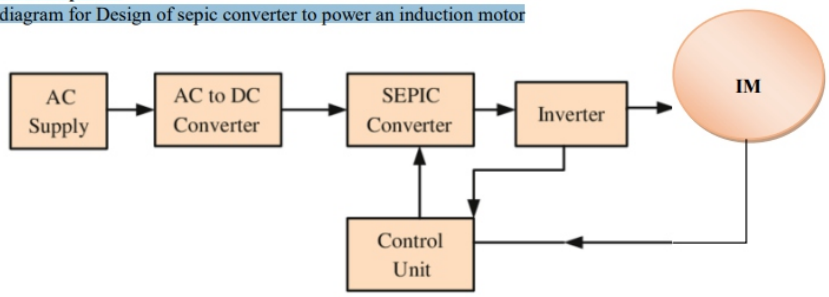


Fig : Block diagram of power supply unit

SYSTEM MODEL

System Development

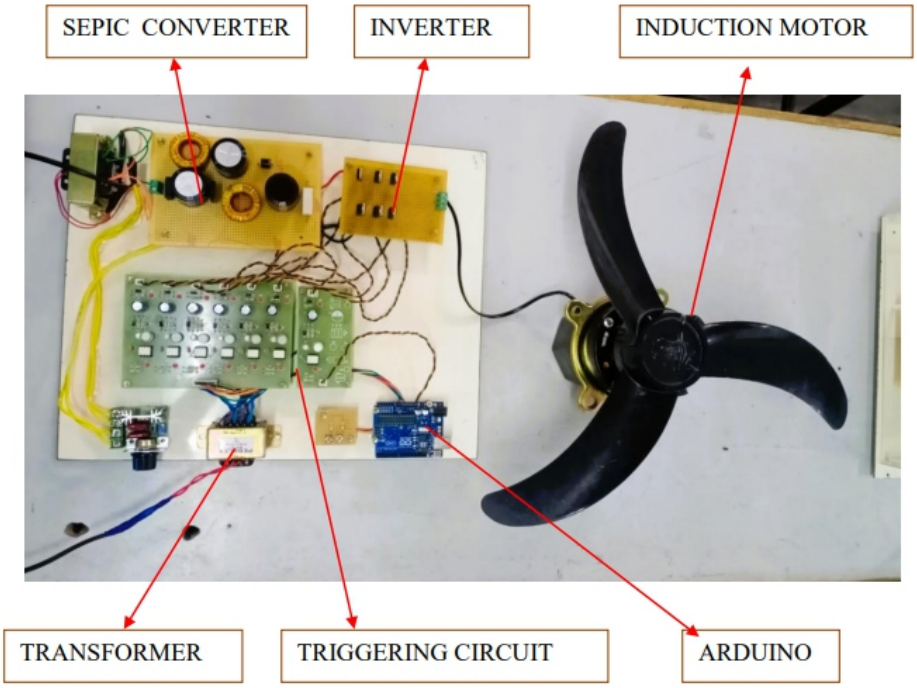
Block diagram for Design of sepic converter to power an induction motor



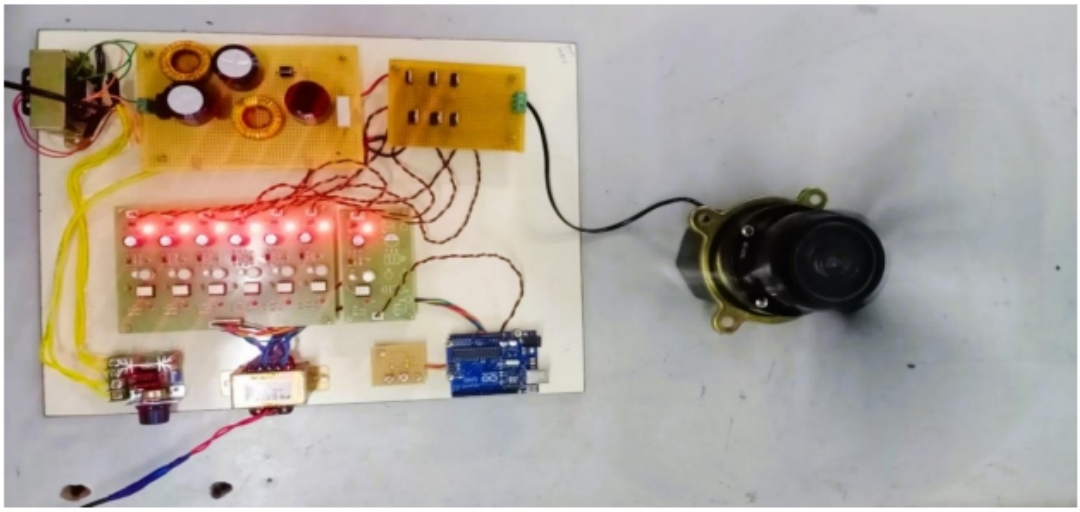
Block diagram of proposed system

RESULT

Complete induction motor using SEPIC modified converter is implemented in hardware section. The converter and inverter section are done in two seperate PCB's. After verifying the output from the converter, then it is connected to the inverter input of the second PCB. Two dsPIC's are used for separate control of converter and inverter. In convert induction motor drive using modified SEPIC converter and three phase Inverter side, only a gate pulse is required which can be generated using simple control logic. In inverter, SPWM is used and six gate pulses are generated from another dsPIC. A prototype is built to verify the theoretical results of the drive. The converter operation is verified by giving 230V.



Induction motor is at off condition



Induction motor is at running condition

The hardware prototype of SEPIC converter and voltage source inverter is constructed to run a induction motor. Since the cost of the PV panel is high, dc supply for V0 = D Vin 1-D the SEPIC converter is given from the power supply unit. In both the SEPIC converter and voltage source inverter circuits the selected switch is MOSFET.

Driver circuit used to drive MOSFET switch of the SEPIC converter circuit is constructed with the IR2112 driver IC. IR2112 is a 14 pin IC. The pins 1 and 7 are the output pins and they can be given to the gate terminals of two MOSFET switches.

The input voltage of the hardware prototype is the 12V DC input of the SEPIC converter. This 12V DC input voltage is measured and The controller circuit output pulse has the magnitude of 5V. the driver circuit output of 10V. the boosted DC voltage of 200V from the SEPIC converter circuit. Finally 180V peak to peak AC square wave, which is the output of inverter circuit. With the implemented hardware prototype a induction motor is running with the speed of 1440rpm. The rated speed of the machine is 1500 rpm.The specifications of this induction motor is 230V, 0.35A, 50W, 1500rpm.

CONCLUSION

In conclusion, the design of a SEPIC converter for powering an induction motor has been successfully accomplished, meeting the specified objectives and requirements. The design focused on achieving an efficient and reliable power supply system while considering factors such as power determination, voltage regulation, input power factor correction, control and protection mechanisms, efficiency optimization, compactness, cost-effectiveness, and compliance with standards and regulations.

FUTURE SCOPE

The design of a SEPIC converter to power an induction motor opens up several future scope opportunities for further enhancements and advancements. Here potential area for future exploration Investigate and implement advanced control techniques, such as model predictive control (MPC) or adaptive control algorithms, to further optimize the performance of the SEPIC converter system. These techniques can enhance dynamic response, improve efficiency, and provide better fault tolerance.

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Hybrid Energy Management System Using SEPIC Converter for AC Grid Systems

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ABSTRACT

This project deals AC micro-grid connected buck boost converter with inverter existing method compared to proposed AC micro-grid SEPIC converter with inverter system in mat lab simulink. AC micro grid system has been proposed as a SEPIC converter with inverter power network that enables the introduction of a large amount of solar energy using distributed photovoltaic and battery units source side input. The voltage flow battery, a key component for supply demand adjustment in the AC micro grid system.

Keywords: MC – Microgrid, SEPIC Converter, PV-Photo voltaic

INTRODUCTION

The grid-connected inverter plays a key role in the robustness and reliability of the renewable energy system, such as photovoltaic (PV) [1] and wind turbine system [2]. In some extreme cases, the open-circuit faults (OCFs) in inverters may interrupt the normal operation of the PV system [3]-[4]. The OCFs occurring in the inverter include auxiliary power failure, gate drive failure, power components failure, controller disorder, etc. All the faults, matter they are intermittent or permanent, may cause an abnormal emergency stop to the inverter. The OCF detection in inverters has drawn considerable attention. Up to now, a lot of OCF detection methods for inverters have been proposed, which can be divided into two categories according to different detection variables: (1) current based detection method, (2) voltage-based detection method. In [5] and [6], by using the amplitude and phase of the normalized average current vector, a current-based fault detection method is used to check the OCFs of inverters. This method needs extra current sensors and only can be used for fault detection of three-phase inverter. In [7], based on wavelet analysis and neural networks, another current-based detection method is developed to detect OCFs in an inverter. Nevertheless, its portability is poor due to the complex detection algorithm. In [8], the fault condition of the inverter is detected on the basis of the radius of the Concordia current pattern. However, all the current-based detection methods are susceptible to load disturbance or noise, and they are easy to misreport the OCF when the load suddenly changes.

Compared with the current-based detection method, the voltage-based detection method is not easily affected by load disturbance or noise. In [9], a fault diagnosis method is proposed, which uses the voltage error between the estimated and measured value to detect faults of the inverter.

However, additional voltage transducers required increase the system cost. In [10]-[12], the output voltage variation characteristics of the inverter with OCF are deeply analyzed, and the corresponding detection method is put The conventional current-based and voltage-based detection methods only can be directly used for the systems of single-stage inverter.

For the OCF detection of double-stage PV systems consisting of power optimizers (POs) and an inverter, these methods must combine with fast and reliable communication to coordinate the actions of POs and the inverter.

CONVERTER DESIGN

A. SEPIC Converter

The Single-Ended Primary-Inductor Converter, SEPIC, can be described as a boost converter followed by a buck-boost converter, see Figure 2. The converter consists of two inductors, one switch, one diode, one capacitor and one output capacitor. The voltage over the coupling capacitor, Cp, will be an average voltage of Vin and with a large capacitor it will be close to constant. Cp prevents any DC current from owing between the highand low-voltage side and it also enables the output voltage to be lower than the input voltage. Without Cp, the diode would be forward biased and nothing would prevent a current owing from Vin to Vout when Vin > Vout. The diode needs to be connected to a known potential; this is accomplished with the second inductance, L2, which connects the diode to ground.

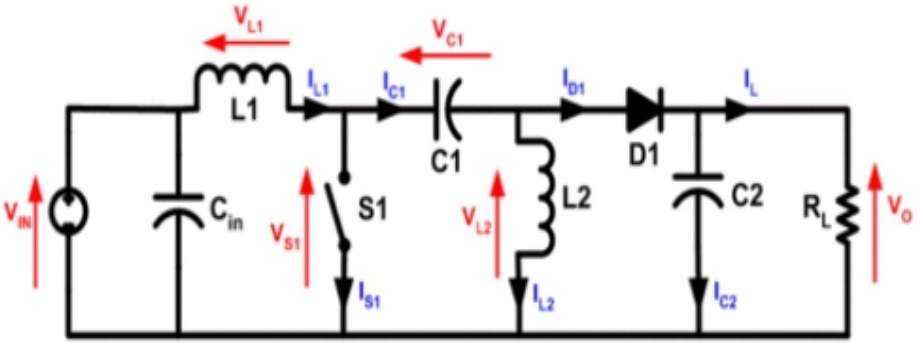

Fig 1 Circuit diagram of SEPIC

B. Circuit Operation

The schematic diagram for a basic SEPIC is shown in Figure 1. As with other switched mode power (specifically DC-to-DC converters), the SEPIC exchanges energy between the capacitors and inductors in order toconvert from one voltage to another. The amount of energy exchanged is controlled by switch S1, which is typically a transistor such as a MOSFET. MOSFETs offer much higher input impedance and lower voltage drop than bipolar junction transistors (BJTs), and do not require biasing resistors as MOSFET switching is controlled by differences in voltage rather than a current, as with BJTs.A SEPIC converter can work in continuous conduction mode (CCM) and Discontinuous conduction mode (DCM). In CCM steady state, since the average voltage across L1 and L2 is zero, the average voltage across coupling capacitor C1 is input voltage (Vin). Since the average current flowing through C1 is zero, the inductor L2 is the only source of output current. The average current through inductor L2 is the average current of the load, which is independent of the input voltage.

PROPOSED CIRCUIT DIAGRAM

Proposed circuit diagram of SEPIC and Buck boost converter with inverter system is shown in Figure 2.

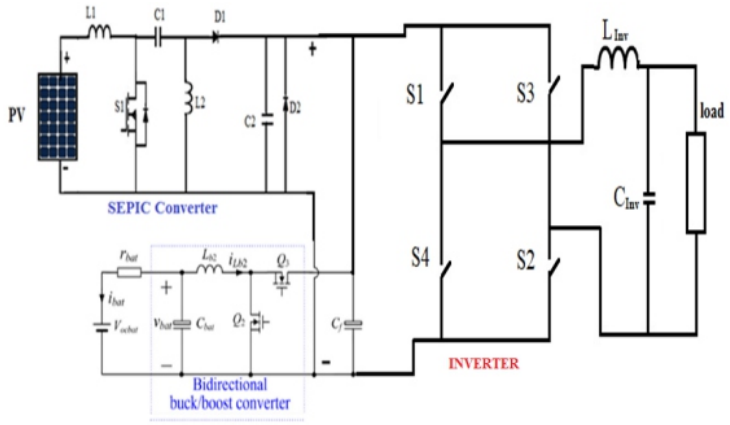

Fig 2 Simulink model of proposed circuit Diagram of PV based SEPIC & Buck boost Converter

From the PV 15V DC is given to the input of SEPIC converter. The SEPIC converter is step up the both voltage and current. The voltage is stepped up from 15V DC to 90V DC output voltage. From the Battery 15V DC is given to the input of the Buck boost converter. The buck Boost converter is step up both voltage and current .Likewise it charges the battery. So it act as a bidirectional buck boost converter. The boost and buck boost converter are connected in parallel for hybrid combination to improve the converter voltage and current. The output voltage of boost converter and buck boost converter are given to the input voltage of the inverter. The inverter converts the 90V DC to 90V AC output voltage .The inductor and capacitor working as square to sine wave.The sine wave AC voltage is given to R-load. The SEPIC converter boosts both voltage and current whereas in boost it only boost the voltage alone. Hence the proposed circuit system with SEPIC and buck boost converter has better performance than existing circuit system. Block diagram of proposed circuit Diagram of PV based SEPIC & Buck boost Converter is shown in Figure 3.

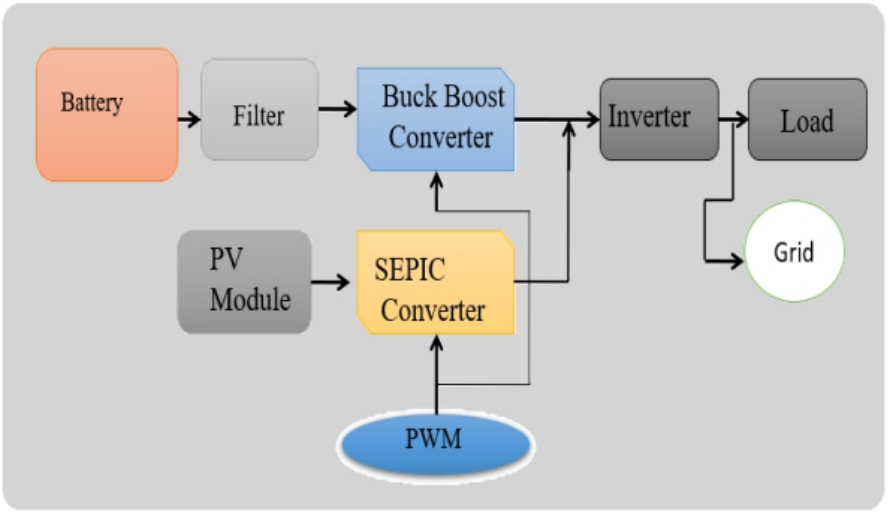

Fig 3 Block diagram of proposed circuit Diagram of PV based SEPIC & Buck boost Converter

RESULTS & DISCUSSION

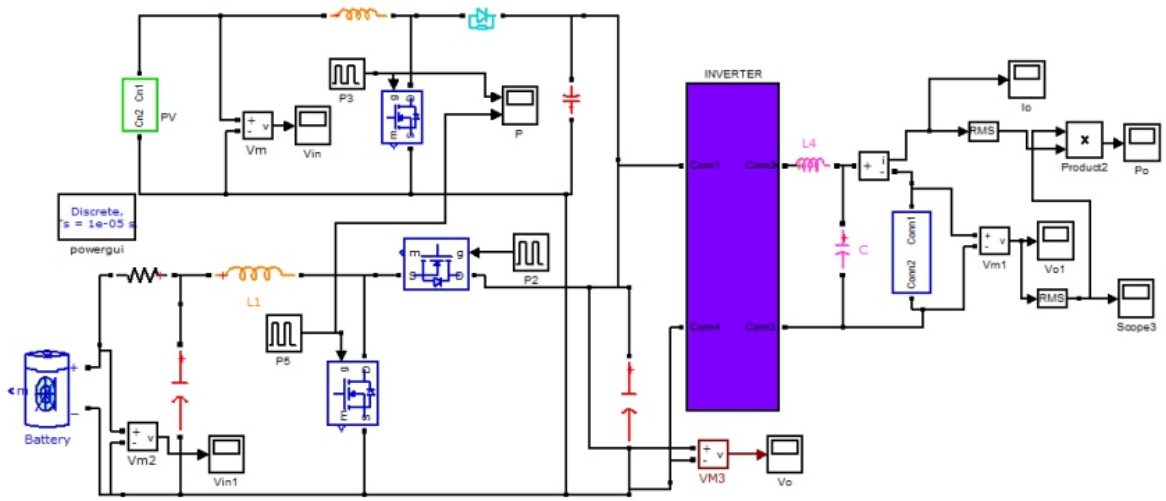

Fig 4 Circuit diagram of PV and battery based cascaded boost and buck boost converter with inverter

Circuit diagram of PV and battery based cascaded boost and buck boost converter with inverter is shown in figure 4. Input voltage is shown in figure 5 and its value is 15V. Switching pulse of boost and buck converter S1 and S2 is shown in figure 6and its value is 1V. Voltage across Boost and buck boost converter is shown in figure 7 and its value is 60V. Ripple voltage across boost and buck boost converter is shown in figure 8 and its value is 1.8V. Circuit diagram of single phase inverter is shown in figure 9. Switching pulse of single phase inverter S3 and S4 is shown in figure 10 and its value is 1V.

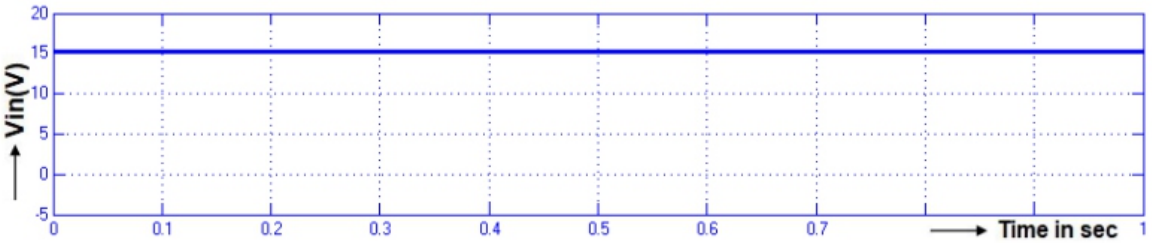

Fig 5 Input voltage across PV

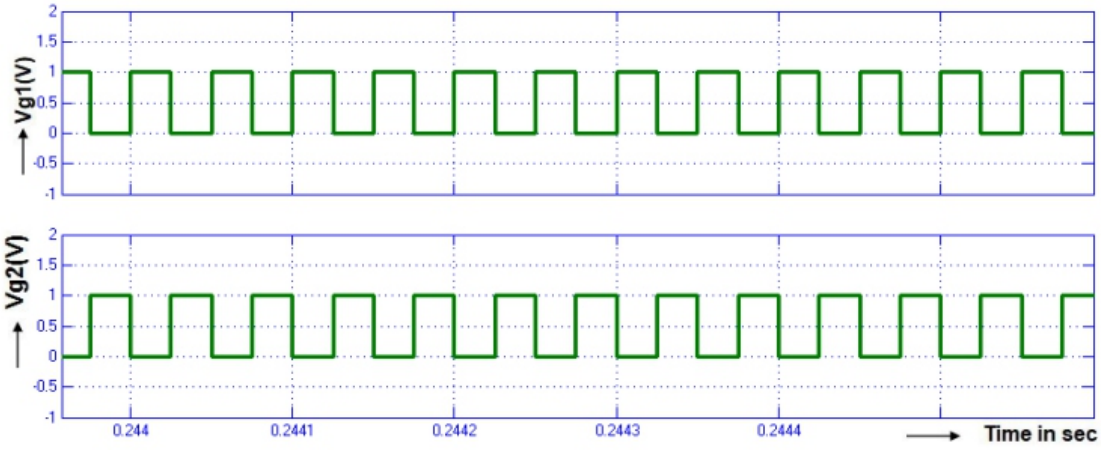

Fig 6 Switching pulse of boost and buck boost converter S1 and S2

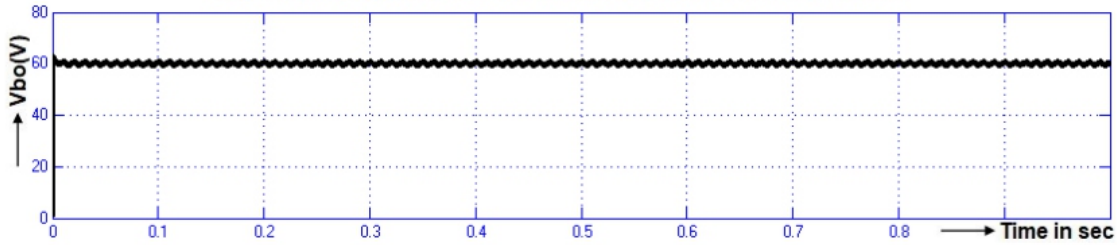

Fig 7 Voltage across Boost and buck boost converter

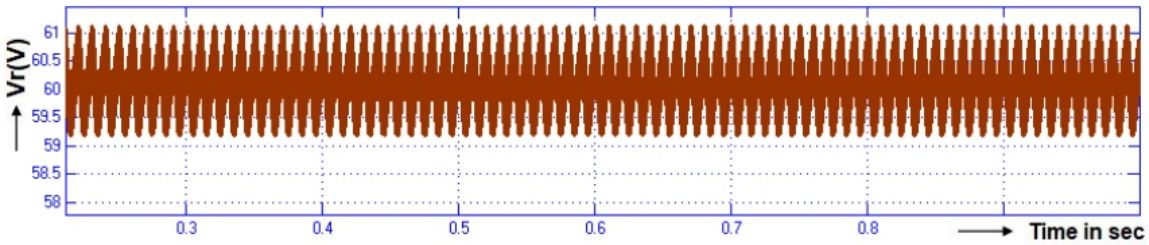

Fig 8 Ripple voltage across boost and buck boost converter

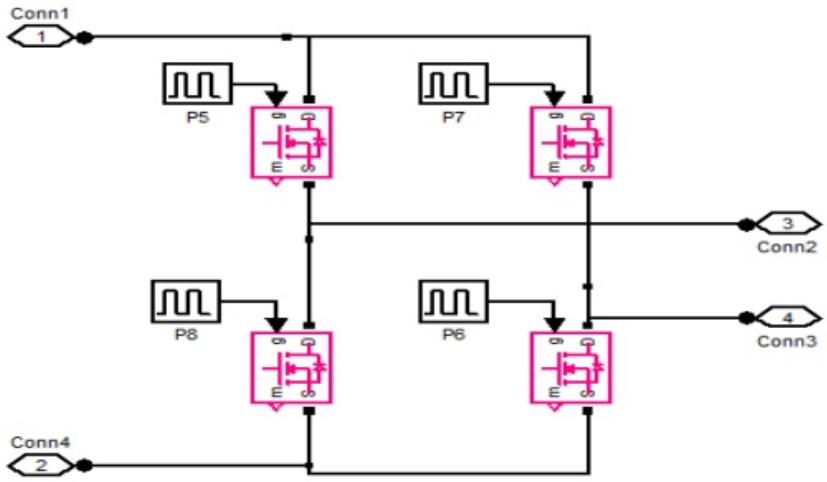

Fig 9 Circuit diagram of single phase inverter

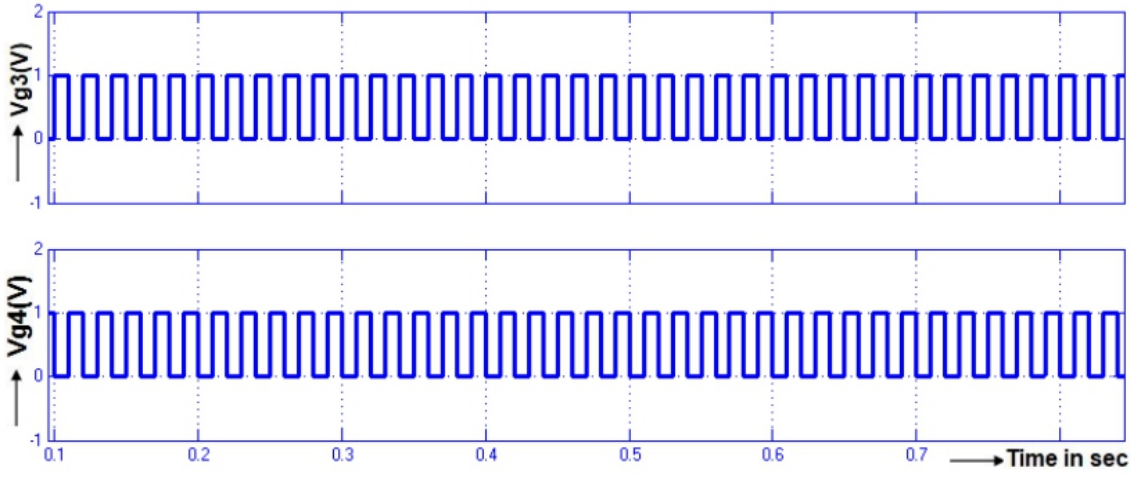

Fig 10 Switching pulse of single phase inverter S3 and S4

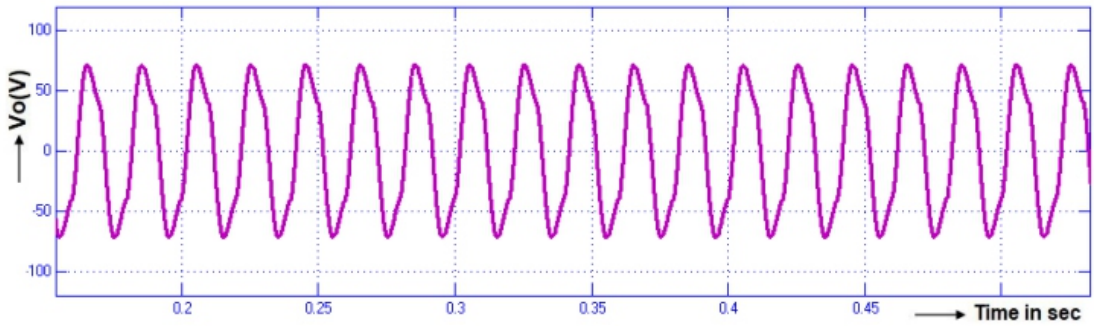

Fig 11 Voltage across R-load

Voltage across R-load is shown in figure 11 and its value is 60V. Output voltage THD is shown in figure 12 and its value is 16.30%. Current through R-load shown in figure 13 and its value is 1.5A. Output current THD is shown in figure 14 and its value is 13.71%. Output power is shown in figure 15 and its value is 52W.

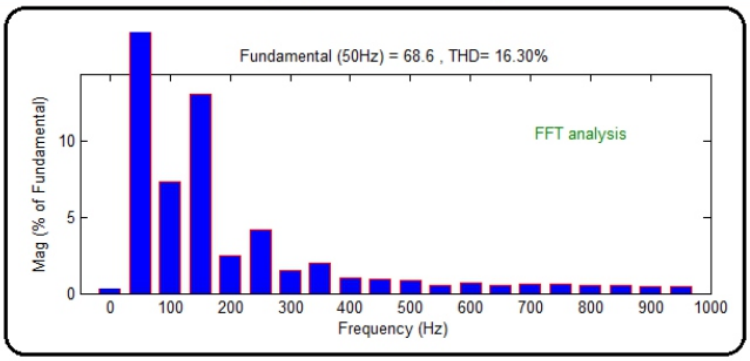

Fig 12 Output voltage THD

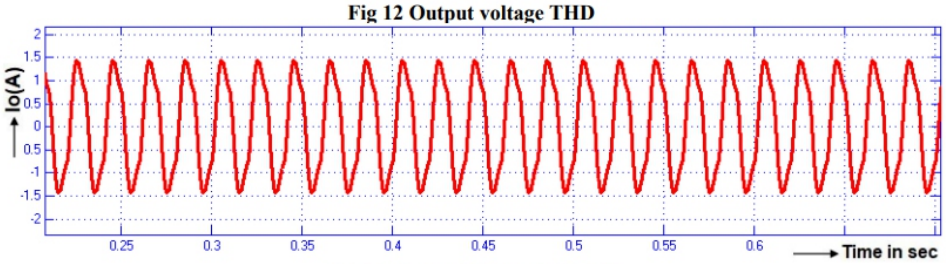

Fig 13 Current through R-load

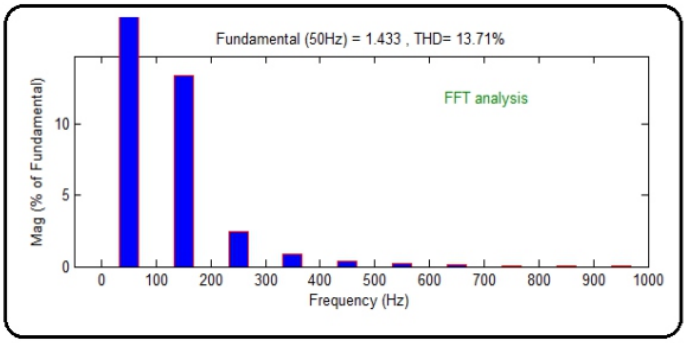

Fig 14 Output current THD

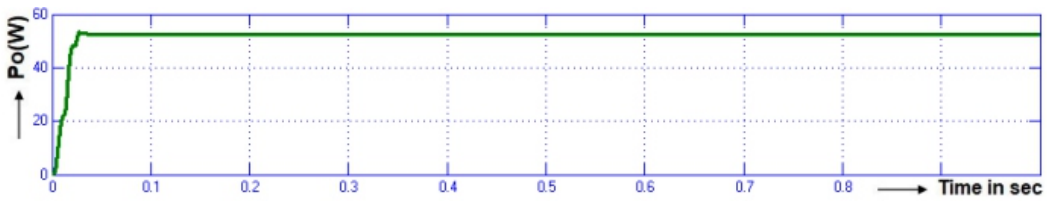

Fig 15 Output power

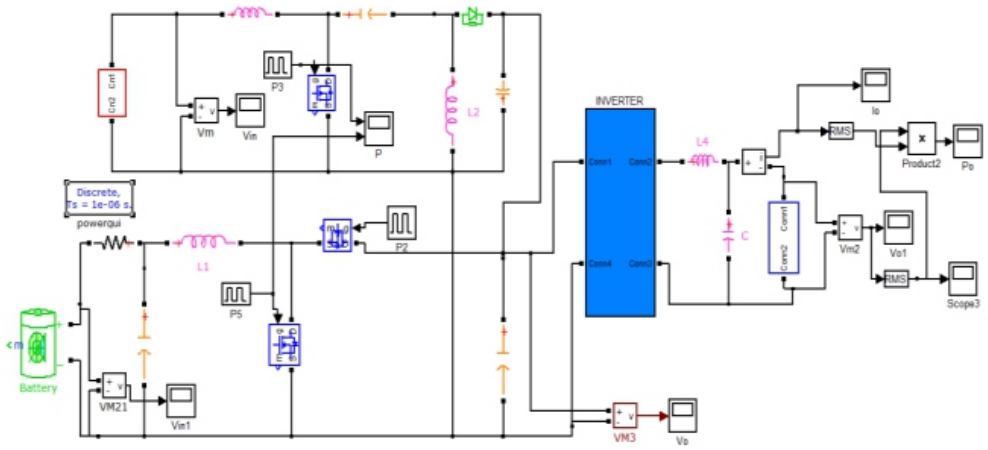

Fig 16 Circuit diagram of PV and battery based cascaded SEPIC and buck boost converter with inverter

Circuit diagram of PV and battery based cascaded SEPIC and buck boost converter with inverter is shown in figure 16. Input voltage is shown in figure 17 and its value is 15V. Switching pulse of SEPIC and buck boost converter S1 and S2 is shown in figure 18 and its value is 1V. Voltage across SEPIC and buck boost converter is shown in figure 19 and its value is 95V. Ripple voltage across SEPIC and buck boost converter is shown in figure 20 and its value is 1.0V.

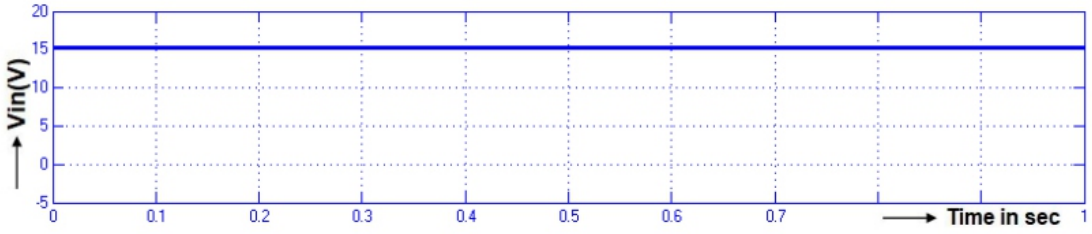

Fig 17 Input voltage

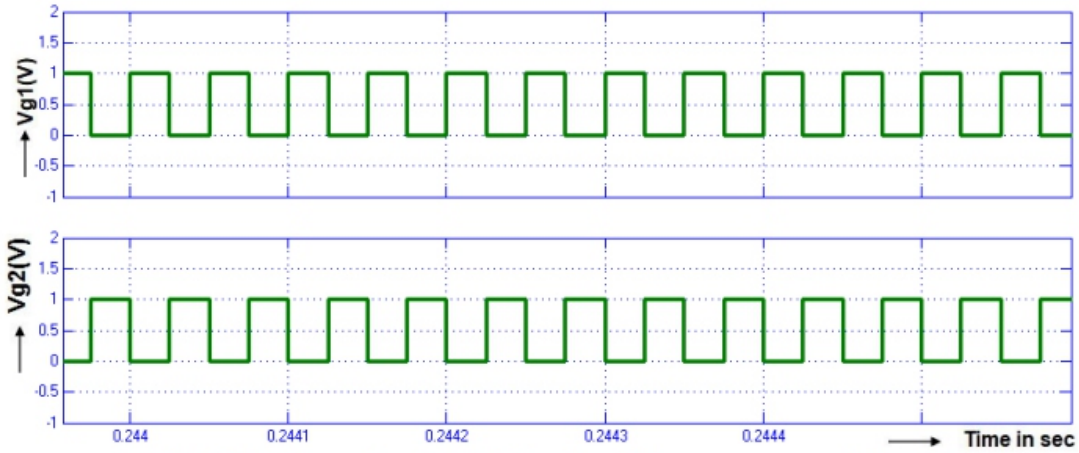

Fig 18 Switching pulse of SEPIC and buck boost converter S1 and S2

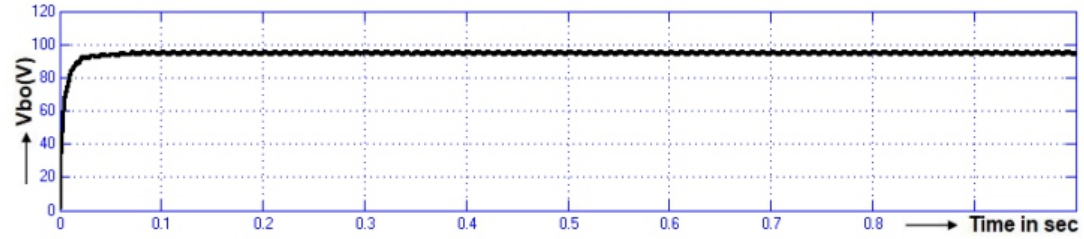

Fig 19 Voltage across SEPIC and buck boost converter

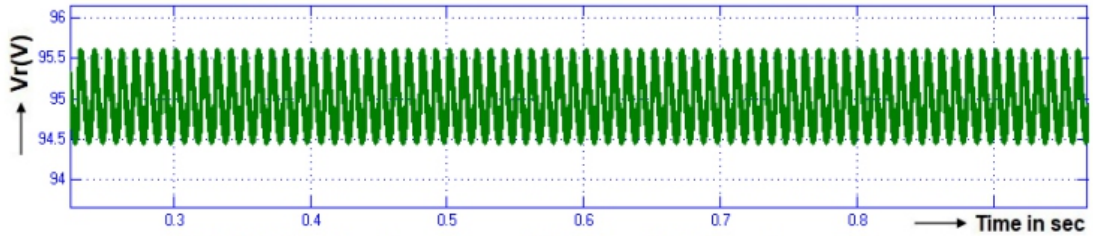

Fig 20 Ripple voltage across SEPIC and buck boost converter

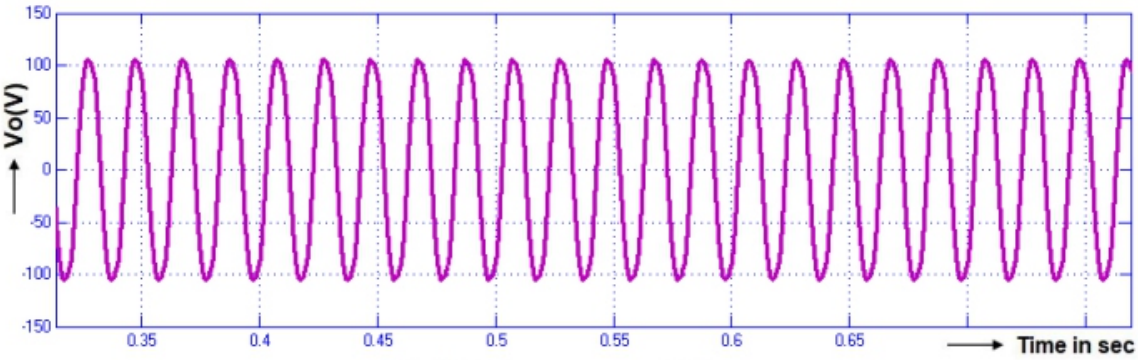

Fig 21 Voltage across R-load

Voltage across R-load is shown in figure 21 and its value is 95V. Output voltage THD is shown in figure 22 and its value is 6.60%. Current through R-load shown in figure 23 and its value is 2A. Output current THD is shown in figure 24 and its value is 6.94%. Output power is shown in figure 25 and its value is 125W.

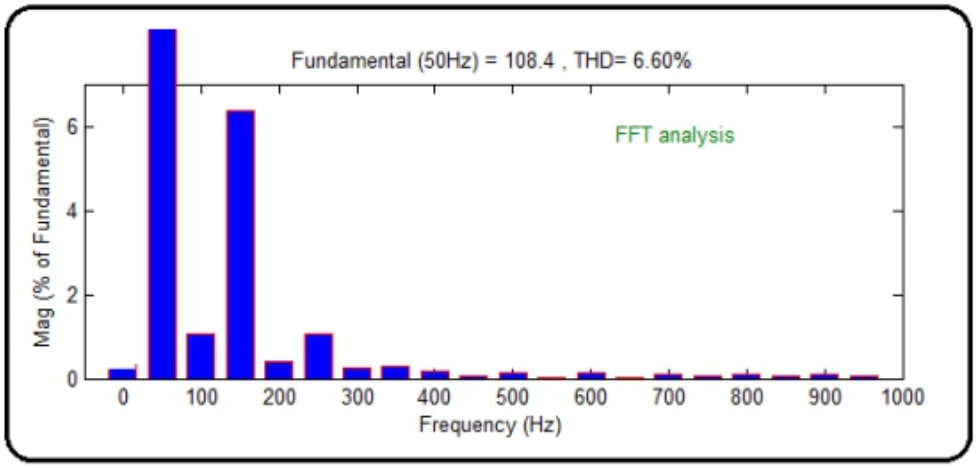

Fig 22 Output voltage THD

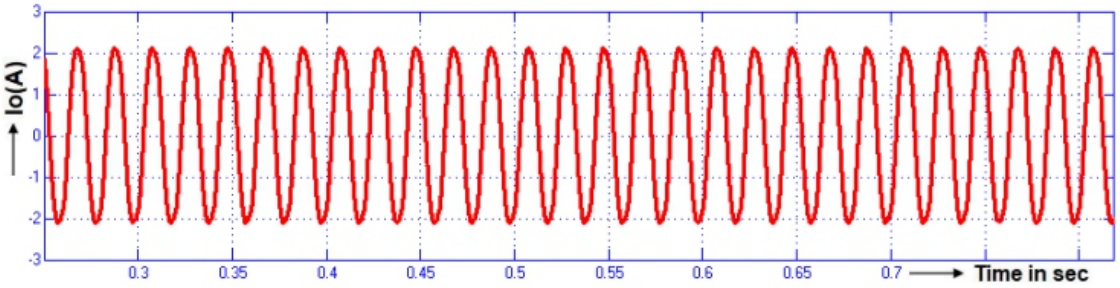

Fig 23 Current through R-load

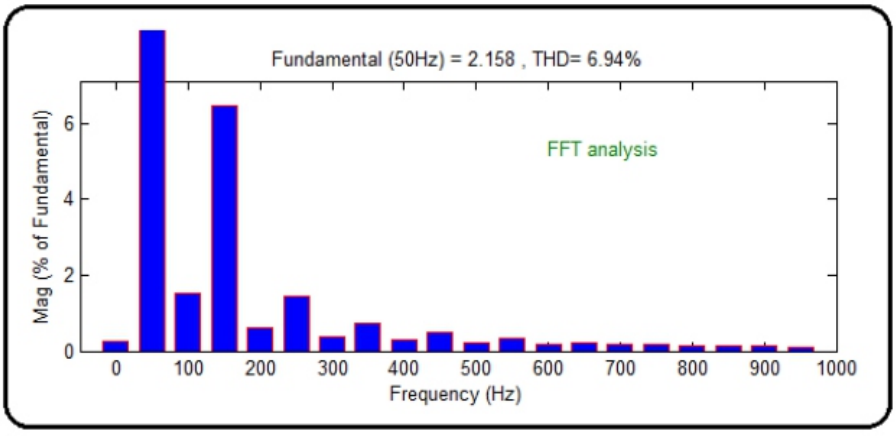

Fig 24 Output current THD

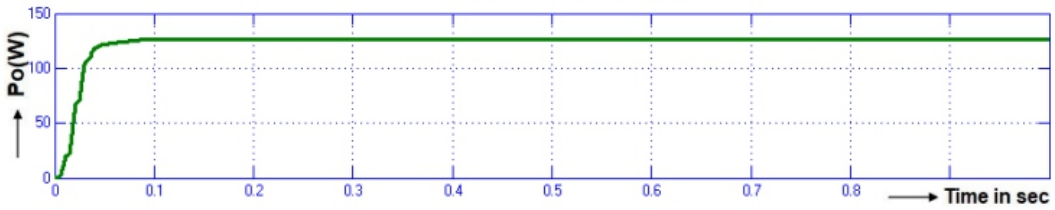

Fig 25 Output power

TABLE-I COMPARISON OF OUTPUT VOLTAGE, RIPPLE VOLTAGE AND OUTPUT POWER

Single phase system	Vin(V)	Vo(V)	Vor(V)	Po(W)
Boost and Buck boost converter	15	60	1.8	52
SEPIC and Buck boost converter	15	95	1.0	125

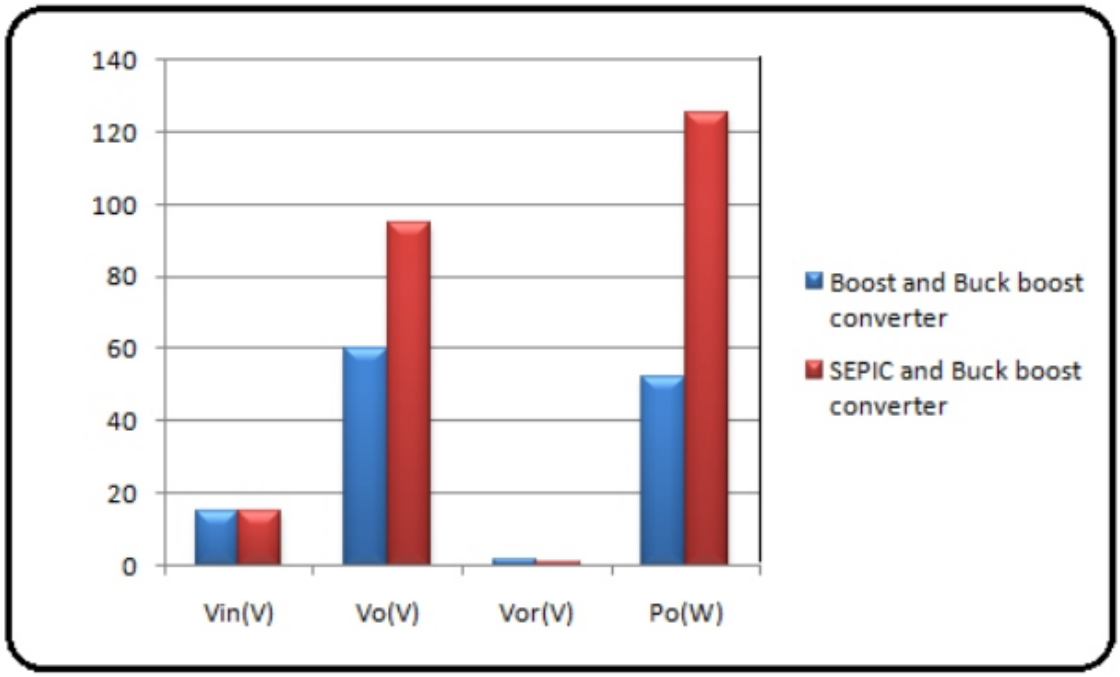

Fig 26 Bar chart Comparison of output voltage, ripple voltage and output power

Table-I shows the Comparison of output voltage THD and output current THD for Boost and Buck boost converter and SEPIC and Buck boost converter. The figure 26 shows the bar chart Comparison of output voltage, ripple voltage and output power for Boost and Buck boost converter and SEPIC and Buck boost converter. TheTable-II shows the Comparison of output voltage, ripple voltage and output power for Boost and Buck boost converter and SEPIC and Buck boost converter. The figure 27 shows the bar chart Comparison of output THD and output current THD for Boost and Buck boost converter and SEPIC and Buck boost converter. Output voltage is improved from 60V to 95 V by using Proposed SEPIC –Buck boost with inverter system. Ripple voltage is reduced from 1.8V to 1.0V by using SEPIC –Buck boost with inverter system. Output power is improved from 52W to 125W by using SEPIC –Buck boost with inverter system. Output voltage THD reduced from 16.30% to 6.60% using SEPIC –Buck boost with inverter system. Output current THD reduced from 13.71% to 6.94% using SEPIC –Buck boost with inverter system. Hence Proposed SEPIC –Buck boost with inverter system has better performance than conventional Boost–Buck boost with inverter system.

TABLE-II COMPARISON OF OUTPUT VOLTAGE THD AND OUTPUT CURRENT THD

Single phase system	Output voltage THD (%)	Output current THD (%)
Boost and Buck boost converter	16.30	13.71
SEPIC and Buck boost converter	6.60	6.94

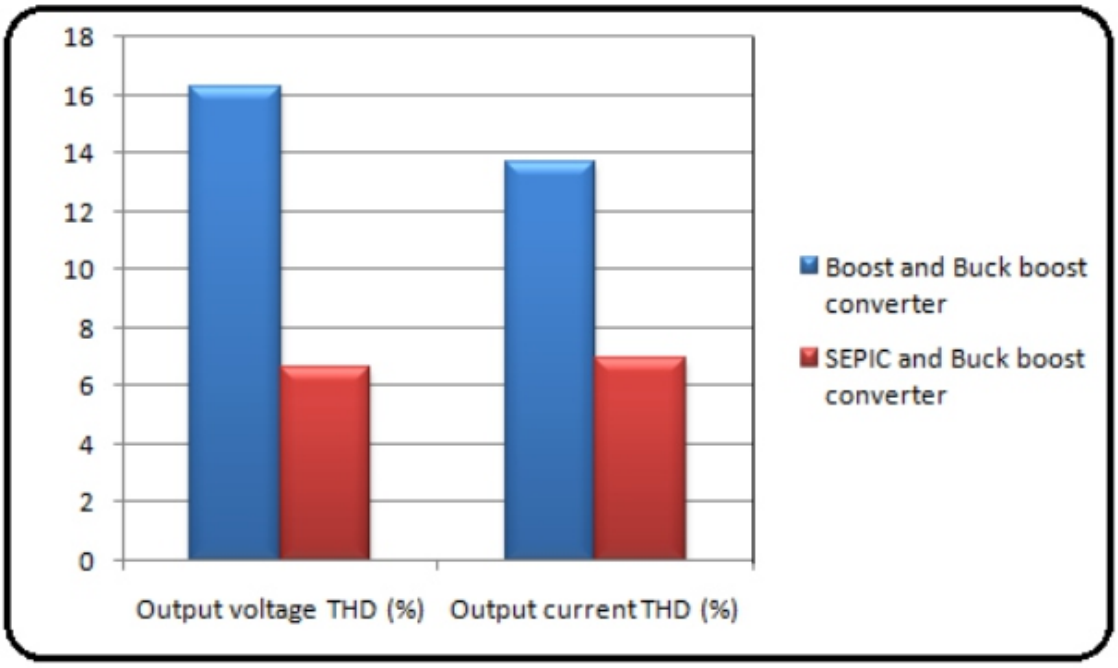

Fig 27 Bar chart Comparison of output voltage THD and output current THD

CONCLUSION

Existing PV boost and buck-boost converter and Inverter open loop system is simulated. Proposed PV SEPIC and battery buck-boost converter with Inverter open loop system is simulated. Above systems are compared. Output voltage is improved from 60V to 95 V by using Proposed SEPIC –Buck boost with inverter system. Ripple voltage is reduced from 1.8V to 1.0V by using SEPIC –Buck boost with inverter system. Output power is improved from 52W to 125W by using SEPIC –Buck boost with inverter system. Output voltage THD reduced from 16.30% to 6.60% using SEPIC –Buck boost with inverter system. Output current THD reduced from 13.71% to 6.94% using SEPIC –Buck boost with inverter system. Hence Proposed SEPIC –Buck boost with inverter system has better performance than conventional Boost–Buck boost with inverter system.

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SUPER BOOST DC-DC CONVERTER FOR SOLAR POWERED ELECTRICAL VEHICLE

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ABSTRACT

The electric vehicle (EV) is growing in popularity as a substitute for fossil fuels in India. In a commercial EV, the solar PV charges the battery while the battery also powers the car. The typical buck-boost bidirectional DC-DC converter's design prevents the solar PV power from being fully utilised when the battery state of charge (SOC) reaches its ideal level. This study suggests a revolutionary dual input super boost (DISB) DC-DC converter for electric vehicles that are fuelled by solar energy in order to get around this restriction. By functioning in six different modes, the suggested converter efficiently utilises solar PV power. Additionally, it benefits from a wide speed control range decreases the quantity of conduction devices in each mode, increasing efficiency.

Keywords: Software Development Kit, Electric Vehicles, Plug-in Hybrid EVs and Solar Powered Operated Evs

INTRODUCTION

In the present period, electric vehicles (Evs), plug-in hybrid electric vehicles (PHEVs), and solar-powered operated electric vehicles (SPEVs) gain popularity and significantly grow the industry. In order to reduce pollution and save money on the importation of fossil fuels, the Indian government gives SPEVs the fullest amount of attention. In order to produce the necessary amount of power during acceleration and to store, use, and gain energy during regenerative braking, power electronic converters are crucial components in electric vehicles (Evs).

In the present period, electric vehicles (Evs), plug-in hybrid electric vehicles (PHEVs), and solar-powered operated electric vehicles (SPEVs) gain popularity and significantly grow the industry. The Indian government devotes all of its attention on SPEVs among these vehicles in order to reduce pollution and to reap financial benefits.

Various converter configurations have been proposed to optimise the performance of EVs. A multiphase converter is proposed with four unsymmetrical input voltage ports. Each input source connected to the

the converter can have power flow from load to source and vice versa. However, it requires a larger number of passive elements and deteriorates the operating efficiency. A novel converter has been derived with a single-coupled inductor instead of two separate inductors, which improves efficiency. However, it has more design complexity and is larger in volume. Different non-isolated multi-input DC-DC converters (MIDCs) have been developed with one inductor, but higher power electronic component counts reduce efficiency. The proposed converter does not support the facility to transfer energy between two different sources. Recently, a novel multi input DC-DC converter has been proposed to integrate renewable energy sources with EVs. A paralleled DC-DC converter for electric bus applications with droop control is reported. These proposed converters can deliver power simultaneously and individually to the load among the input connected sources, but they have a larger number of devices and increase the complexity.

The basic block diagram of commercial EVs is illustrated to overcome the cost and complexity of the conventional approach. MIDC converter configurations were approached by several researchers to integrate different sources like FC, batteries, and solar PV into a hybrid energy system (HES). Many researchers have proposed several non-isolated and isolated MIDC converter topologies for PHEVs. A non-isolated dual input-integrated boost converter is reported in An isolated and a nonisolated DC-DC converter for integrating solar PV and batteries have been reported. However, a separate DC-DC converter is required to store and retrieve the energy from the battery. Whereas the proposed converter has the flexibility to charge the battery without an additional separate converter This methodology for designing a RBS has been described. Three RBSs were built and tested, first using a HIL test bed and then installed on an electric hybrid city bus. For the serial RBS, a key problem of how to adjust the friction braking force has been solved. Some factors have been taken into account in increasing the energy regeneration efficiency.

This paper presents a bilateral robot system that is driven by a static friction-free drive system and implemented on a real-time network structure. The goal is to realise a force reflecting bilateral teleportation with haptic impression transmission over computer networks. The paper considers two subjects relating to the bilateral robot. The first is static friction, which degrades the performance of manipulation and results in a poor haptic impression. A new transmission mechanism named the "twin drive system," developed by the authors, resolves this problem. The transmission mechanism, which resembles the differential gear of automobiles, is essentially free of static friction. This static-friction-free motion greatly contributes to the broad range of motion control applications. The second subject is the time delay of the network, which may cause serious problems such asinstability of the feedback system. To avoid such delays, the authors developed a new real-time network protocol stack (RTNP).

This paper has explored the various types of power split e-CVTs now used or being planned for near-term use. The e-CVT, as such systems are generically known, offers smooth and seamless driveability during all modes of operation. The e-CVT is also more efficient than mechanical CVTs, especially as the transmission ratio coverage approaches 6:1. This paper has developed the dynamics of the e-CVT and shown the similarity of the various types and their major differences.

PROBLEM FORMULATION

It is easy to qualitatively describe the benefits of regenerative braking in vehicles, but a much more difficult analysis is required to quantify these benefits.

Thermodynamics and vehicle dynamics as related to the conversion of energy provide the starting point for such an analysis. The first law teaches that energy can be neither created nor destroyed but can be converted from one form to another. The 2nd law distinguishes between the orderly energy of a force and the random energy of molecules in motion in the form of elevated temperature or heat crossing a boundary because of a temperature difference, which are forms of energy that cannot propel a vehicle. The brakes de-generatively convert the orderly kinetic and/or potential energy of a vehicle into disorderly energy.

The first step towards evaluating the potential benefits of regenerative braking is to develop a set of equations to define the power requirements for any vehicle. A similar model has been developed for performing vehicle power requirement analysis for other purposes, such as electric vehicle range and performance, the effects of soft tyres, and additional fuel consumption resulting from raising the speed limits. The principles of conservation of energy and Newton's laws of motion yield equation 1, which takes the form of power supplied Ptotal, which is equal to the power consumed by the vehicle at all times.

Ptotal =dKE/dt + dPE/dt + Ptyres + Paero (1)
The first power demand term is the rate of change of kinetic energy, which corresponds to mass times acceleration times velocity per equation 2.
dke/dt = d/dt [MV2/2] = m v dv/dt (2)
The second term is the rate of change of potential energy, which is the vehicle weight times the vertical component of the velocity, which is grade times velocity as defined by equation 3.
dpe / dt = m g gr v (3)
The third term is the power consumed by the tyres, which is the rolling resistance of the tyres. This requires a tyre coefficient, which is the ratio of tyre rolling resistance to vehicle weight. The power consumed by the tyres is the product of the tyre coefficient, the weight, and the speed, as shown in equation 4.
P tyres = Ct m g V (4)
At lower speeds, we can assume the aerodynamic losses to be negligible. Hence, assuming P = 0.

OBJECTIVES OF WORK

In modern days, electric vehicles (Evs), plug-in hybrid EVs (PHEVs), and solar-powered EVs (SPEVs) have become popular and expanded the business drastically. Among these vehicles, the Indian government focuses its full attention on the SPEVs to control pollution and obtain financial savings against fossil fuel importation.

The power electronic converters play an important role in EVs to deliver the required amount of power during acceleration and to store, utilise, and gain energy during regenerative braking.

HARDWARE EQUIPMENT

Quickly after launch, a variety of breakout boards for the ESP8266 started becoming available. The most popular ones have been the ESP-NN series, which typically integrates the SOC along with flash RAM, a crystal, and even an onboard antenna. The most salient distinction between different ESP-NN models are the pins that are broken out from the ESP8266.

As the ESP8266 was developed as a serial-to-Wi-Fi adapter, its firmware implemented an interpreter for AT commands. Thus, initial usage of the IC was limited to using either a USB-to-Serial adapter or a separate microcontroller (e.g., ATmega328) to issue AT commands over the ESP8266's Serial UART interface. For this reason, the ESP-01 board quickly became popular amongst the ESP8266 community because of its 24, 0.1-inch-pitch connector that can be easily wired to a USB-to-Serial adapter.

The connector gave access to the pins used for serial communication, namely RX and TX, as well as 4 control pins, GPIO0, GPIO2, CH_PD, and RST (reset), along with VCC and GND.However, other ESP-NN boards offer access to a wider variety of pins, although their packaging is of a custom surface-mount device with castellated pins, as seen in the documentation page linked above. With the different ESP-NN boards, we began to experiment with the ESP-12E. The main reason is that this module was chosen by the developers of the Node MCU project for their hardware Dev Kit 1.0.

Because the ESP8266 provides a cost-effective solution to the rapidly growing market of internet-connected projects and devices (i.e., the so-called Internet of Things), it has become one of the most popular development platforms over the past year and a half. In consequence, a dedicated community has formed around the platform, which has been focused on improving its functionality.For starters, different firmware options have been ported to run on the ESP8266, effectively taking it from a simple serial to Wi-Fi adapter into a fully functional microcontroller with access to its GPIO and hardware-based functions like PWM, I2C, 1-Wire communication, and ADC; all this, of course, in addition to maintaining its Wi-Fi capabilities.

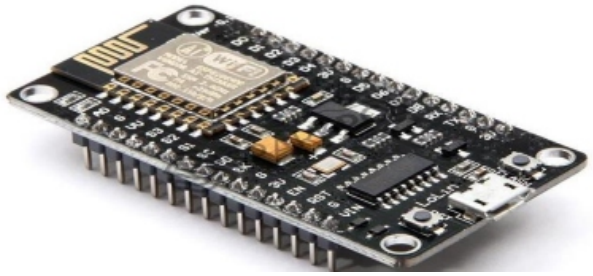


Fig-1 ESP8266-12E

FUNCTIONAL DESCRIPTIONS

MCU:

The ESP8266EX is embedded with a Tensilica L106 32-bit microcontroller (MCU), which features extra-low power consumption and a 16-bit RSIC. The CPU's clock speed is 80 MHz. It can also reach a maximum value of 160 MHz. The ESP8266EX is often integrated with external sensors and other specific devices through its GPIOs; codes for such applications are provided in examples in the SDK.

MEMORY ORGANISATION

Internal SRAM and ROM

The ESP8266EX Wi-Fi SOC is embedded with a memory controller, including SRAM and ROM. The MCU can visit the memory units through I/O, D/O, and AHB interfaces. All memory units can be visited upon request, and a memory arbiter will decide the running sequence according to the time when these requests are received by the processor. According to our current version of the SDK provided, the

SRAM space that is available to users is assigned as below:

RAM size 36 kB, that is to say, when ESP8266EX is working in station mode and is connected to the router, programmable space accessible to the user in the heap and data sections is around
There is no programmable ROM in the SOC; therefore, user programmes must be stored in an external SPI.

EXTERNAL SPI FLASH

This module is mounted with a 4 MB external SPI flash to store user programmes. If larger, definable storage space is required, a SPI flash with a larger memory size is preferred. Theoretically speaking, up to 16 MB of memory capacity can be supported.

CONNECTING DC MOTOR WITH MICROCONTROLLER

Microcontrollers can't drive the motors directly. So we need some kind of drivers to control the speed and direction of motors. The motor drivers will acts as interfacing devices between micro controllers and motors. Motor drivers will act as current amplifiers since they take a low current control signal and provide a high current signal. This high current signal isused to drive the motors. Using L293D chip is the easy way for controlling the motor using microcontroller. It contains two H bridge driver circuits internally.

This chip is designed to control two motors. L293D has two sets of arrangements where 1 set has input 1, input 2, output1, output 2, with enable pin while other set has input 3, input 4, output 3, output 4 with other enable pin.

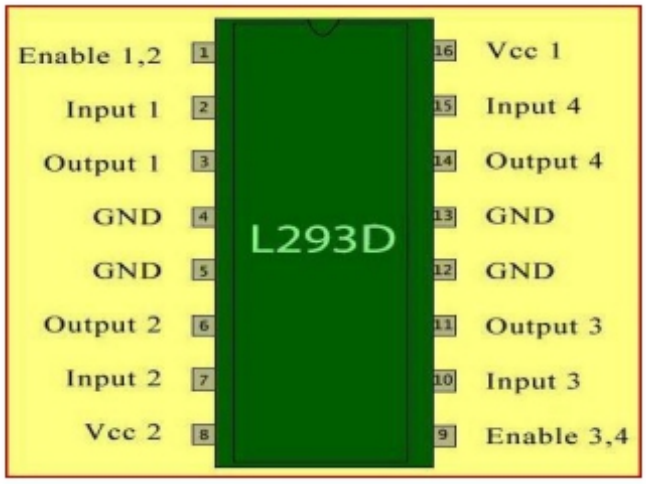


Fig-2 DC motor interfaced with L293D microcontroller

L293D has two set of arrangements where one set has input 1, input 2, output 1 and output 2 and other set has input 3, input 4, output 3 and output 4, according to above diagram,

If pin no 2 and 7 are high then pin no 3 and 6 are also high. If enable 1 and pin number 2 are high leaving pin number 7 as low then the motor rotates in forward direction.

If enable 1 and pin number 7 are high leaving pin number 2 as low then the motor rotates inreverse direction.

Today dc motors are still found in many applications as small as toys and disk drives or in largesizes to operate steel rolling mills and paper machines.

THE MOTOR AS A GENERATOR AND WORKING

Regenerative braking is a braking method that utilises the mechanical energy from the motor by converting kinetic energy into electrical energy and feeding it back into the battery source. Theoretically, the regenerative braking system can convert a good fraction of its kinetic energy to charge up the battery, using the same principle as an alternator. In regenerative braking mode, it uses the motor to slow down the car. When the driver applies force to the brake pedal, the electric motor works in reverse, thus slowing the car. While running backwards, the motor acts as the generator and recharges the batteries.

Meanwhile, figure 1 shows the car in normal running condition, whereas the motor is turning forward and taking energy from the battery. By using regenerative braking, it vastly reduces the reliance on fuel, boosting fuel economy and lowering emissions (1, 2). These types of brakes work effectively in driving environments such as stop-and-go driving situations, especially in urban cities. The regenerative braking system provides the majority of the total braking force during low-speed and stop-and-go traffic, where most deceleration is required. In the regenerative braking system, the braking controller is the heart of the system because it controls the overall process of the motor. The functions of the brake controller are to monitor the speed of the wheel, calculate the torque and rotational force, and generate electricity to be fed back into the batteries. During the braking operation, the brake controller directs the electricity produced by the motor into the batteries.

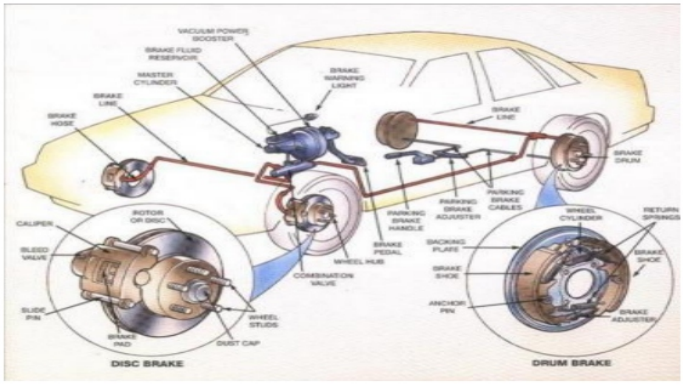


Figure 3 : Conventional System

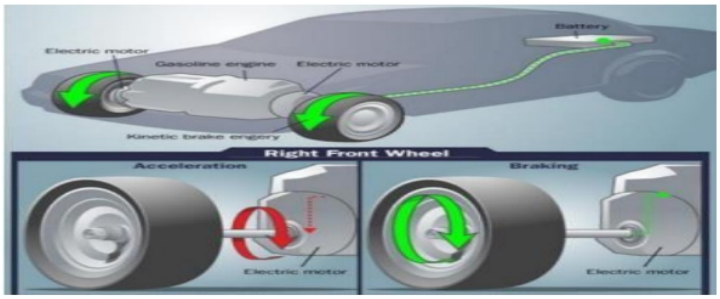


Fig-4 Regenerative braking system

L293D MOTOR DRIVER IC

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. The l293d can drive small and quiet big motors as well, check the Voltage Specification at the end of this pagefor more info.

It works on the concept of H-bridge. H-bridge is a circuit which allows the voltage to be flown in either direction. As you know voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction, hence H-bridge IC In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller.

There are two Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin1 and 9 need to be high. For driving the motor with left H-bridge you need to enable pin 1 to high. And for right H-Bridge you need to make the pin 9 to high. If anyone of the either pin1 or pin9 goes low then the motor in the corresponding section will suspend working. It's like a switch

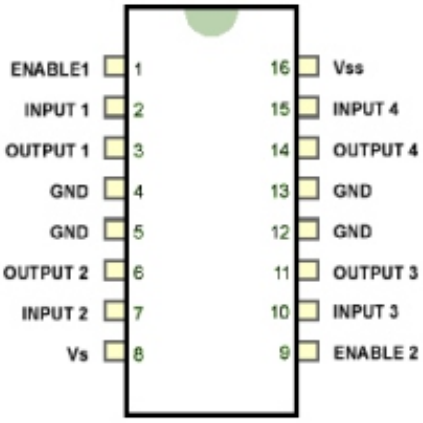


Fig-5. Pin Diagram

WORKING OF L293D

There are 4 input pins for l293d, pin 2, 7 on the left and pin 15 ,10 on the right as shown on thepin diagram. Left input pins will regulate the rotation of motor connected across left side and right inputfor motor on the right hand side. The motors are rotated on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1.

In simple you need to provide Logic 0 or 1 across the input pins for rotating the motor.

L293D Logic Table

Let's consider a Motor connected on left side output pins (pin 3, 6). For rotating the motor in clockwise direction the input pins has to be provided with Logic 1 and Logic 0.

• Pin 2 = Logic 1 and Pin 7 = Logic 0 | Clockwise Direction
• Pin 2 = Logic 0 and Pin 7 = Logic 1 | Anticlockwise Direction
• Pin 2 = Logic 0 and Pin 7 = Logic 0 | Idle [No rotation] [Hi-Impedance state]
• Pin 2 = Logic 1 and Pin 7 = Logic 1 | Idle [No rotation]

In a very similar way the motor can also operate across input pin 15, 10 for motor on the right handside.

Circuit Diagram for L293D motor driver IC controller

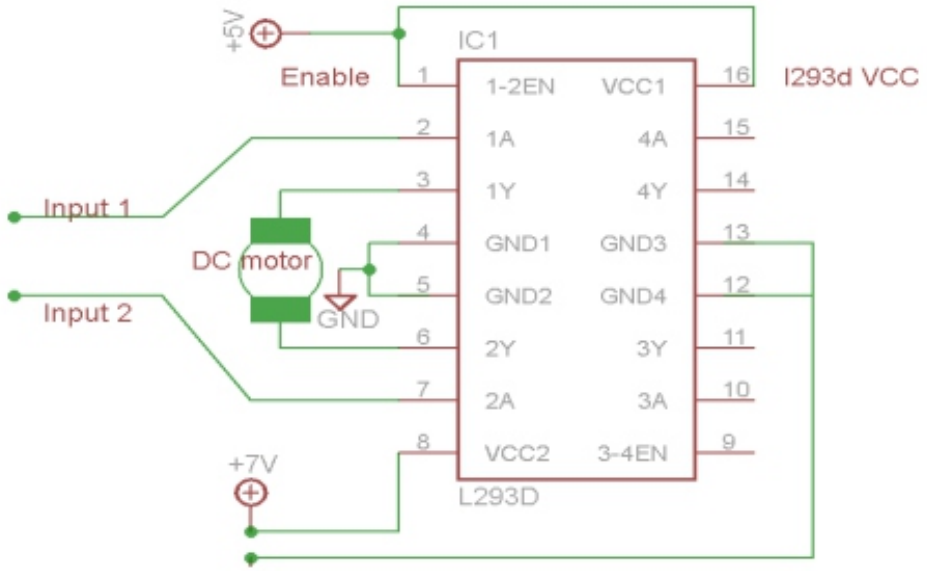
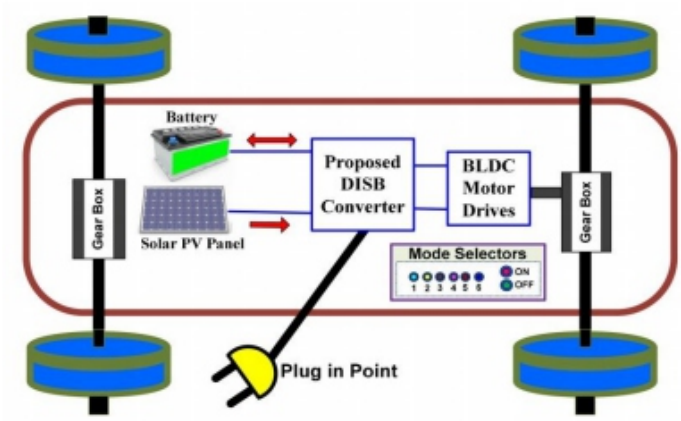
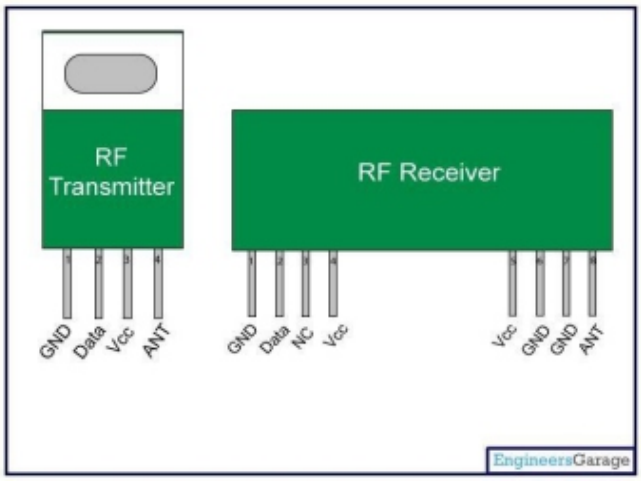


Fig- 6 L293 IC Controller

ANALYSIS DESIGN



RF MODULE (TRANSMITTER & RECEIVER)



connected at pin 4. The transmission occurs at a rate of 1 Kbps–10 Kbps. The transmitted data is received by an RF receiver operating at the same frequency as the transmitter.

The RF module is often used along with a pair of encoders and decoders. The encoder is used for encoding parallel data for ransmission feed, while reception is decoded by a decoder. HT12E-HT12D, HT640-HT648, etc. are some commonly used encoder/decoder pair Ics.

X.Conclusion

From the experiment performed, we can conclude that the use of photovoltaic solar cells combined with electric-type regenerative braking and the generated electrical power are stored in batteries through a DC-DC boost converter for fast charging of batteries, high efficiency, and the performance of limited-capability electric vehicles.

SCOPE FOR FUTURE WORK

Regenerative braking systems require further research to develop a better system that captures more energy and stops faster. As time passes, designers and engineers will perfect regenerative braking systems, so these systems will become more common. All vehicles in motion can benefit from these systems by recapturing energy that would have been lost during the braking process.

Future technologies in regenerative brakes will include new types of motors that will be more efficient as generators, new drive train designs that will be built with regenerative braking in mind, and electric systems that will be less prone to energy losses.

The world needs a method or a technology that saves energy from getting wasted. Energy conservation is in urgent need. In the case of automobiles, energy conservation can be done by using regenerative braking systems (RBS). When driving an automobile, a great deal of kinetic energy is wasted when brakes are applied, which then makes the start-up fairly energyconsuming. The main aim of this project was to develop a product that stores the energy that is normally lost during braking and reuses it. The use of regenerative braking systems in automobiles provides us with the means to balance the kinetic energy of the vehicle to some extent, which is lost during the process of braking. The regenerative braking system used in the vehicles serves the purpose of saving a part of the energy lost during braking. Also, it can be operated at high temperature range and are efficient as compared to conventional braking

systems. The results from some of the tests conducted show that around 30% of the energy delivered can be recovered by the system. Regenerative braking systems have a wide scope for further development and energy savings. The use of more efficient systems could lead to huge savings in the economies of any country.

RESULT

1) Controlling the vehicle using radio frequency (RF) with a frequency of 433 MHz to move the robot in different directions without using any external signals like Wi-Fi or Bluetooth.
2) Generating electrical power from solar panels and charging the batteries using DC to DC boost converters for fast charging
3) Generating electrical power from a DC generator at the time of braking is called regenerative The generated power is stored in rechargeable batteries.

(Whenever the speed of vehicles is 70 to 100 KMPH, only regenerative braking works; whenever the vehicle speed is high, only it will generate power.)

Due to the fact that this is a prototype, we can't move the robot at high speeds, so here we are rotating the DC generator shaft manually to exhibit the regenerative concept.

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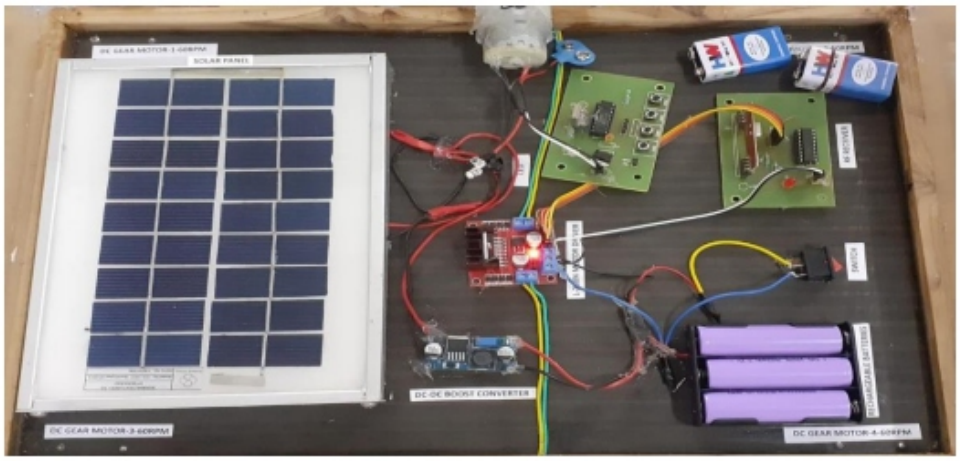

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DESIGN AND FABRICATION OF ROBOTIC ARM VEHICLE CONTROLLED BY BLUETOOTH TECHNOLOGY

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ABSTRACT

In this new era, robots are used in various areas such as welding, painting, assembly etc. Robotic arms are used in various areas such as military, defense, Medical Surgeries, pick and place function in industrial automation applications. This is due to the vast potential it holds in reducing human effort in performing tasks faster will still maintaining operational accuracy. By sending the robotic vehicle to hazards environment like chemical analysis, firework manufacturing industry, bomb diffusing etc. It be accessed by android application and the application can control the movement of vehicle as well as its robotic arm.

This system consists of a mechanical based robotic arm comprise of a Bluetooth module which work as the receiver for vehicle by sending commands to the microcontroller. Which executes according to the signals received by Bluetooth technology. This steps require for developing and designing the arm's structure and mechanical components, such as joints, links, and end-effectors. Implementing control algorithms to achieve the desired motion.

In this project work, choosing the right type of electric motors to drive the arm's movement and integrating the sensors with other feedback devices, to improve the arm's accuracy. On successful completion on this project, Precise, Repeatable motions, Increased Efficiency, Increased Dexterity, Improved Interaction, Adaptability, Enhanced Safety and Integration with Other Systems.

INTRODUCTION

Robots are machines that are programmed to perform a specific task autonomously or under human control. They can be used in a variety of settings, from manufacturing and assembly lines to hospitals and households.

A robotic arm is a type of robot that is designed to manipulate objects with precision and accuracy. It typically consists of a series of joints that can be moved in different directions, as well as an end-effector, such as a gripper or tool, that can be used to grasp or manipulate objects.

The flow of a robotic arm depends on its programming and the task it is designed to perform. In general, a robotic arm will first receive instructions from a computer or controller that tells it what task to perform. The arm will then move its joints in a coordinated manner to reach the desired position and orientation. This may involve moving in multiple directions simultaneously to reach the target location.

Once the arm is in position, the end-effector will be used to grasp or manipulate the object. This may involve using a gripper to pick up a part from a conveyor belt, or using a tool to perform a specific task, such as drilling or welding.

After the task is complete, the arm will move back to its starting position or to another position to perform the next task. This may involve reversing the flow of movement and rotating the joints in the

opposite direction.
Overall, the flow of a robotic arm is carefully programmed and controlled to ensure precise and accurate movement that can perform a wide variety of tasks.

3. LITERATURE REVIEW

ARDUINO CONTROLLER PICK AND PLACE ROBOTIC ARM VEHICLE

Kumar Aditya,(2015) This project was a working prototype of the pick and place robotic arm vehicle. The main aim of this review paper is to present the idea of working and principals behind the robotic arm vehicle. This work unravels the fact that man would always want to adhere to safety precautions at workplace and even in its environment, to be able to handle some specific tasks, like sending the robotic vehicle to hazardous environment to obtain samples for chemical analysis.

DESIGN OF MOBILE ROBOT WITH ROBOTIC ARM UTILISINGMICRO CONTROLLER AND WIRELESS COMMUNICATION

Alit Swamardika (2017) The purpose of this study is to design a prototype of a mobile robot equipped witha robotic arm which can be controlled by wireless technology. In this scheme, the mobile robot in the form of 6 Wheel Drive Robot equipped with roboticarm 6 Degree of Freedom and is controlled wirelessly through remote control based on XBee Pro Series 1. XBee pro operates on the IEEE802.15.4 physical radio and operates at 2.4 GHz unlicensed band. X Bee-PRO modules will be loaded by a current of 250 mAwhile ending data (TX) and 50 mA when receiving (Rx).

SMART PHONE CONTROLLED ROBOT

Chaithra.K (2020) In this prototype they proposed design which can pick and place objects safely from one place to another. A robotic arm is designed using Arduino to perform pick and place the objects via Bluetooth commands. The robot gripper is cable of holding the objects in its jaw and safely place from one place to another. The movement of robot is controlled by android based smart phone. The robot receives commands from the application. All the actions or the tasks are controlled by Arduino micro controller with a pair of motor drivers.

4. PROBLEM IDENTIFICATION

Combining a pick and place robotic arm with a Bluetooth-controlled vehicle can present several challenges, including:

Coordination and control between the robotic arm and the vehicle
Navigation and obstacle avoidance
Payload capacity
Battery life

5. OBJECTIVES

The objective for the design and fabrication of a robotic arm vehicle controlled by a Bluetooth module with pick and place function is to create a functional and efficient robot capable of performing complex tasks. Specifically, the objectives include:

Design a robotic arm vehicle that is capable of being controlled wirelessly via a Bluetooth module.

Fabricate the robotic arm vehicle using durable and lightweight materials, ensuring that it is capable of withstanding heavy use.

Develop a user-friendly interface for controlling the robotic arm vehicle, which will make it easy for

the ser to operate.
Develop a user-friendly interface for controlling the robotic arm vehicle, which will make it easy for the user to operate.

6. METHODOLOGY

In today's world, there is multiple robotic arm machine which was working in multiple industries on daily bases some of them are used for automobile manufacturing, nuclear industries, army purposes, etc. But there are so the problem comes to operate the robotic arm moving them from one position to another way bare a big loss to the industry.

This prototype is developed for the multipurpose industrial uses and movable robotic arm that can move from one position to another via the android application and it's very reliable and flexible to operate this prototype.

The command whichever is given that is received by the Hc-05 serial pin RX and provide to the micro controller placed in Arduino Uno the program execute and run the respective command and the prototype work as a response.

There are several existing methods for the design and fabrication of robotic arm vehicles controlled by Bluetooth modules with pick and place functions.

7. Components

Arduino Uno:

It is a microcontroller board based on the ATmega328P, with 14 digital input/output pins, 6 analog inputs, a 16 MHz quartz crystal, a USB connection, and a power jack.

NodeMCU:

It is an open-source development board based on the ESP8266 Wi-Fi chip, with GPIO pins, Wi-Fi connectivity, a USB interface, and Lua scripting capabilities.

PLA (Polylactic Acid):

It is a biodegradable thermoplastic filament used for 3D printing, made from renewable resources such as corn starch and sugarcane.

Gear motors:

These are motors that have a gearbox attached to the output shaft, allowing for increased torque and reduced speed.

Acrylic sheet:

It is a lightweight, shatter-resistant plastic material often used in DIY projects, with high optical clarity and a variety of color options.

HC-05 module:

It is a Bluetooth module that enables wireless communication between devices, with a range of up to 10 meters and support for multiple connection modes.

L293D motor driver:

It is an integrated circuit that allows for the control of DC motors, with features uch as direction and speed control, and protection against overcurrent and over temperature.

8. DESIGN AND FABRICATION

Used Solid Works software to design the mechanical components of the robotic arm, including the base, shoulder, elbow, wrist, and gripper. The design should meet the requirements for payload capacity, range of motion, and precision. Aluminum or acrylic sheets can be used to create the structural components of the arm, gears, and linkages can be used for the joints and movement mechanisms. Use PLA material for fabricating the robotic arm from the designed CAD files. Assemble the components using bolts, nuts, and screws, and use gears to create the joints and movement mechanisms. Fabricate the electronic components, such as the motor driver board and the Bluetooth communication circuit, using soldering and wiring techniques.

Write the code for the micro-controller to control the motors and Bluetooth communication. Use the Arduino IDE and Node MCU to write code inC or a similar programming language. Test the code using a breadboard and jumper wires before final assembly. Assemble the mechanical and electronic components of the robotic arm, including the motors, gears, and Bluetooth module. Use the motor driver board and voltage regulator to power the motors, and connect the Bluetooth module to the micro controller using jumper wires. Test the robotic arm to ensure it meets the requirements for payload capacity, range of motion, and precision. Test the Bluetooth communication to ensure wireless control is working correctly.

Overall, the design and fabrication of a robotic arm vehicle controlled by a Bluetooth module with pick and place function requires expertise in mechanical design, electronic design, programming, and fabrication. The above steps outline a general process for creating such a system, but there may be variations based on specific requirements and available resources.

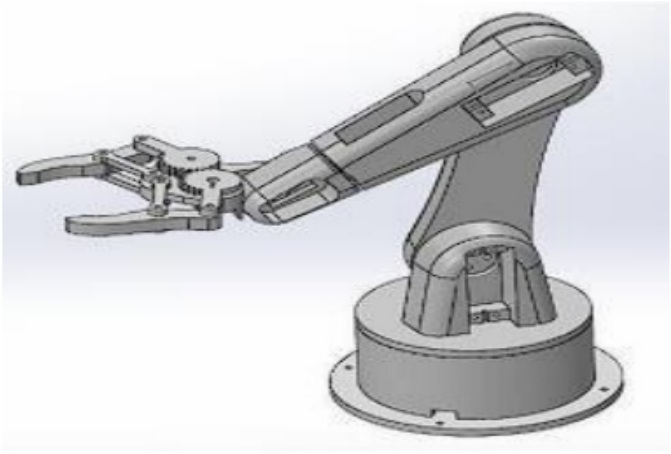


Fig 1: Assembled Robotic Arm Design `

9. Block diagram

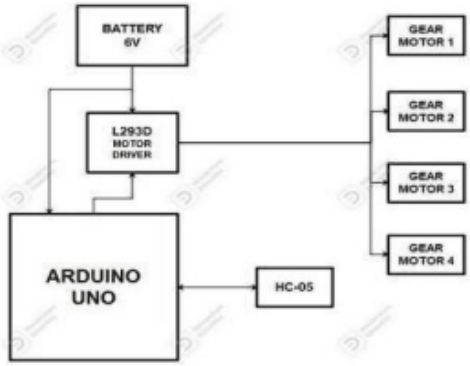


Fig 2 block diagram of robotic vehicle

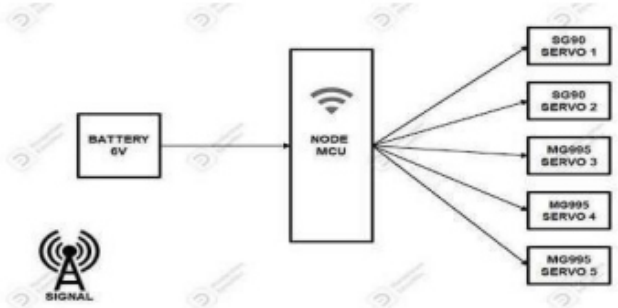


Fig 3 block diagram of robotic arm

10.FABRICATION OF ROBOTIC ARM

Fig 4 Fabrication

Fig 5 Cutting operations

Fig 6 Designing Robotic Arm

RESULT

A pick and place robotic arm along with a movable vehicle is a system that involves the use of a robotic arm mounted on a mobile platform, which can move to different locations to pick up objects and transport them to a different location. The robotic arm is designed to be capable of grasping and manipulating objects of different shapes and sizes with precision. In this project work the cost parameters optimized when compared to the existing Robotic Arm Vehicle.

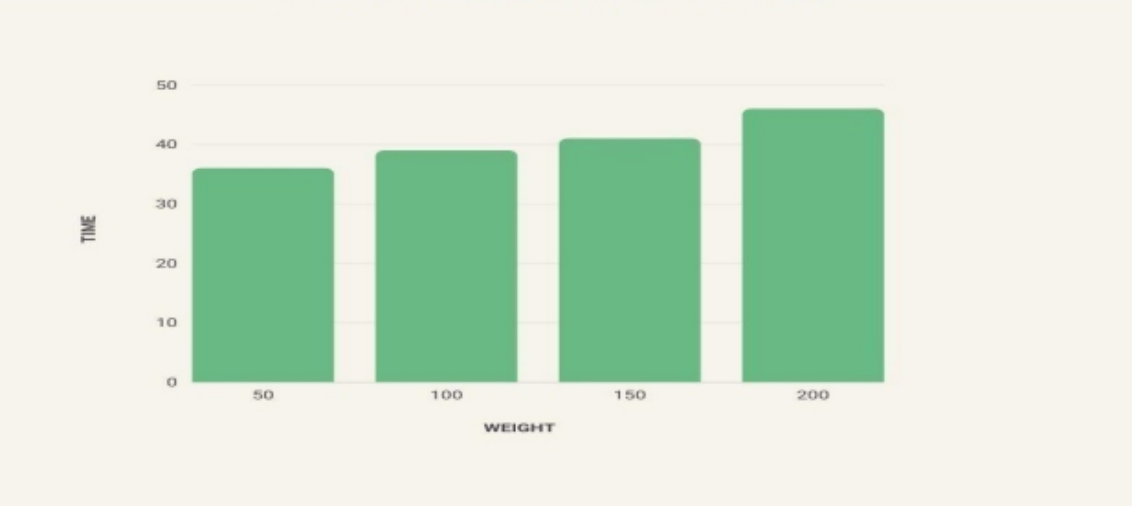
On successful completion of robotic arm vehicle by using Bluetooth technology with the 5degrees of freedom and upto 5mtrs as Bluetooth range of mobile signal. It is very durable upon lifting weights and it can withstand up to 250 grams as a payload of robotic arm.

Robotic arm is made up of PLA material and PLA is a biodegradable thermoplastic polymer that is known for its high strength, stiffness, and heat resistance.It is also safe, non-toxic, and environmentally friendly.

TABLE : Time taken to travel with different loads

s.no	Weight of the object (grams)	Time taken (seconds)	Distance travelled (mts)
1.	50	36	5
2.	100	39	5
3.	150	41	5
4.	200	46	5

Graph : time taken to travel with different loads



b. DISCUSSIONS

The design and implementation of such a system require expertise in mechanical engineering, robotics, and control systems. The robotic arm needs to be designed to havefive degrees of freedom, strength, and precision to accomplish the pick and place tasks. The vehicle must also be designed to be stable, maneuverable, and reliable to transport the arm to different locations. The system can be by a smart phone using wire-less technology.The pick and place robotic arm along with a movable vehicle has variousapplications in industries such as manufacturing, warehousing, logistics, and agriculture. The system can be used to automate repetitive and labor-intensive tasks, improve efficiency, and reduce the risk of injuries and accidents.

Overall, the successful implementation of a pick and place robotic arm along with a movable vehicle requires a multidisciplinary approach, including mechanical, electrical,and software engineering, to design and build a robust and reliable system that meets thespecific needs of the application.

c. CONCLUSION

Upon completion of the robotic arm vehicle with five degrees of freedom. Robotic arm is made up of using PLA material which is biodegradable thermoplastic polymer that is known for its high strength, stiffness, and heat resistance. It is also safe, non-toxic, and environmentally friendly.The use of wireless technology for controlling the system provides ease of use and flexibility for the user, allowing the system to be operated from a distance. The successful implementation in multiple disciplines, including mechanical engineering, robotics, control systems, and software development.The pick and place robot with a movable vehicle controlled by both Wi-Fi and Bluetooth technology has many potential applications in various industries, including manufacturing, logistics, and agriculture. The system can be used to automate repetitive and labor- intensive tasks, improving productivity and efficiency.Overall, the successful implementation of a pick and place robotic arm along witha movable vehicle requires a multidisciplinary approach, including mechanical, electrical, and software engineering, to design and build a robust and reliable system that meets the specific needs of the application.

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