IMPROVING POWER FACTOR BY USING SWITCHING CAPACITOR AND SWITCHING INDUCTOR

[1]Mummadi sai Sandeep, [2] N.Shanmuka sundaram, [3]S.Eranna

[1]Assistant Professor, [2]Professor, [3]Assistant Professor
[1]EEE department,
[1]Annamacharya Institute of technology and sciences, Rajampet, India.

Abstract : In recent times, switching capacitor as well as switching inductor was used to modify the features of the resonant tank with the intention of controlling output voltage and power factor. A new inductive coupling power transfer topology with higher frequency is introduced to get better power factor and good output voltage regulation. The projected inductive coupling power transfer topology is mostly constructed by a voltage controllable power factor corrector as well as a LLC resonant circuit. Resonant frequency control as well as VAR compensation schemes had been projected to augment the contactless coupled transformer coupling effectiveness. Although multi-stage inductive coupling power transfer building works well under steady normal loading circumstances, it can cause important conduction as well as switching losses at light load conditions, and create the controller inappropriate for realistic applications. The series compensated as well as series-parallel compensated capacitor and inductor is used in primary as well as secondary sides of coupling transformer to enhance coupling efficiency along with load range.

***Index Terms* - Resonance, Switching-capacitor, switching inductor resonant frequency control, coupling transformer.**

I. INTRODUCTION

ICPT power supply makes use of a magnetic field to convey power to the load. This expertise has been extensively applied in aerospace electric vehicles, industrial equipment's as well as battery charging systems. The reactive power produced by means of leakage inductance increase system VA rating as well as reduce input power factor, consequently increases system losses and decrease the power transfer efficiency. The switching capacitor/inductor inductive coupling power transfer construction has an improvement of uses in wide range load. In recent times, switching capacitor as well as switching inductor was used to modify the features of the resonant tank with the intention of controlling output voltage and power factor. The difficulty is that resonant tank current augment during output power voltage control procedure, which leads to rising of power component current stress and conduction loss, and diminish circuit transfer effectiveness. To solve this difficulty, the resonant frequency control as well as the var compensation schemes was projected to augment the contactless coupled transformer coupling efficiency. To regulate output voltage, the procedure frequency of inductive coupling power transfer can be moved away resonant frequency. The result is dropping of the contactless coupled transformer coupling efficiency and rising of the system VA rating.

II. METHODOLOGY

A new inductive coupling power transfer topology was put forward to get better the power factor, output voltage regulation as well as effectiveness. The projected inductive coupling power transfer topology is mostly constructed by a voltage controllable power factor corrector as well as a LLC resonant circuit. Using projected voltage controllable power factor corrector, the functions of power factor improvement as well as output voltage regulation can be attained at similar time. Using LLC resonant tank by means of phase-locked control, functions of operation frequency control as well as zero-voltage switching can moreover be obtained. The series compensated as well as series-parallel compensated are used in primary as well as secondary sides of coupling transformer to enhance coupling efficiency along with load range. To solve this difficulty, resonant frequency control as well as var compensation schemes had been projected to augment the contactless coupled transformer coupling effectiveness. An inductive coupling power transfer consists of two autonomous equally fixed electrical systems. The most important side uses an appropriate resonant elevated frequency switching power supply by means of most important compensation to reduce VA rating of supply. In secondary side, compensation is necessary to improve power transfer capability.

The switching capacitor/inductor inductive coupling power transfer construction has an improvement of uses in wide-rating load. Although the switching capacitor/inductor control reaction is slow, and resonant current augment when altering the features of resonant tank. It is leading to the rising of power constituent current stress as well as conduction loss, as well as lessening of circuit transfer effectiveness

III. AN OVERVIEW OF INDUCTIVE COUPLING POWER TRANSFER TOPOLOGY

Inductive Coupling Power Transfer power supply makes use of a magnetic field to convey power to the load and has been extensively applied in aerospace electric vehicles, industrial equipment's as well as battery charging systems. Contactless Energy Transfer transfers energy by means of contactless non-metal means, for instance electromagnetic coupling, capacitive coupling, as well as light. The contactless energy transfer system permit removal of cables, slip as well as sockets, ensuing in unlimited maintenance-free procedure and improved reliability as well as safety. The inductive coupling power transfer regularly uses a contactless coupled transformer in support of magnetic energy transfer. During the energy transfer procedure, an air gap of contactless coupled transformer will lesser electromagnetic coupling effectiveness as well as make considerable leakage inductance. A novel inductive coupling power transfer topology was put forward to get better the power factor, output voltage regulation as well as effectiveness. The voltage gain of inductive coupling power transfer at resonant frequency is changeable when the load is altering. The output voltage is tricky to be regulated to a steady as well as constant value. By means of a DC/DC converter at secondary side to manage output voltage is moreover accessible. Using projected voltage controllable power factor corrector, the functions of power factor improvement as well as output voltage regulation can be attained at similar time. The multi-stage building has additional components, inferior efficiency and additional circuit cost. To diminish the VA rating of power supply, frequency-varied manage is accessible. The ultimate control point becomes not easy to conclude when numerous zero phase angle situations exists in frequency spectrum. The voltage gain of inductive coupling power transfer at resonant frequency is changed when the load is altered and the output voltage is not steady. The multistage building makes use of a DC/DC converter in power secondary circuit. Although multi-stage inductive coupling power transfer building works well under steady normal loading circumstances, it can cause important conduction as well as switching losses at light or else no-load conditions, and create the controller inappropriate for realistic applications. In recent times, switching capacitor as well as switching inductor is used to modify features of resonant tank to order the output voltage.

IV. RESULTS AND DISCUSSION

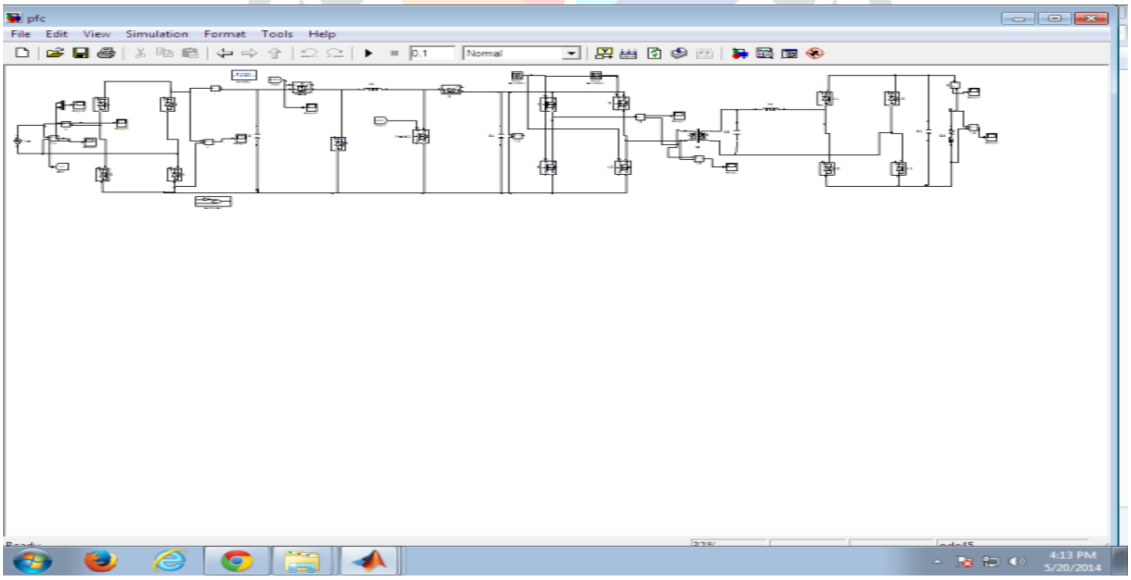

fig:1 Simulation of PFC output voltage

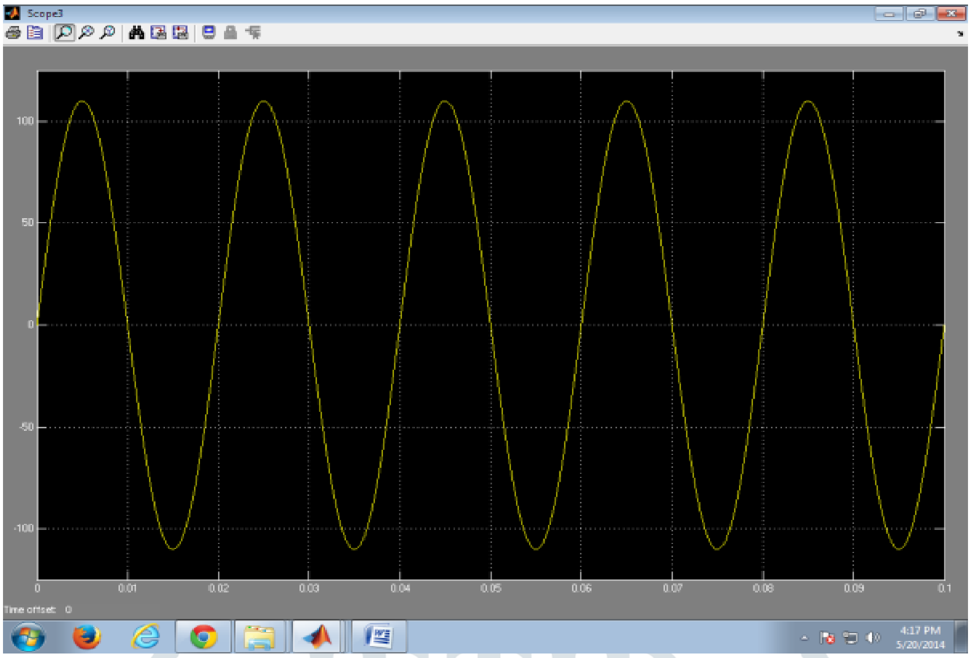

Fig:2 Input Voltage wave form

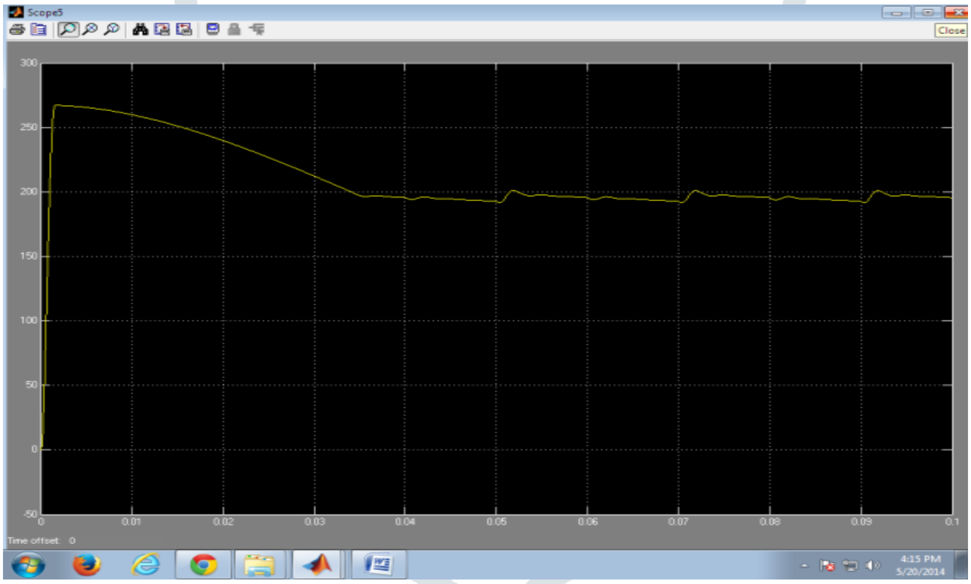

Fig: 3 Output Voltage wave form

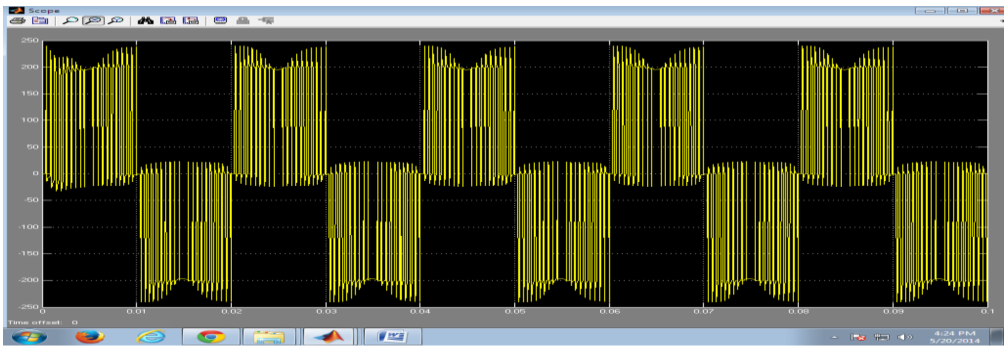

Fig:4 Primary Voltage

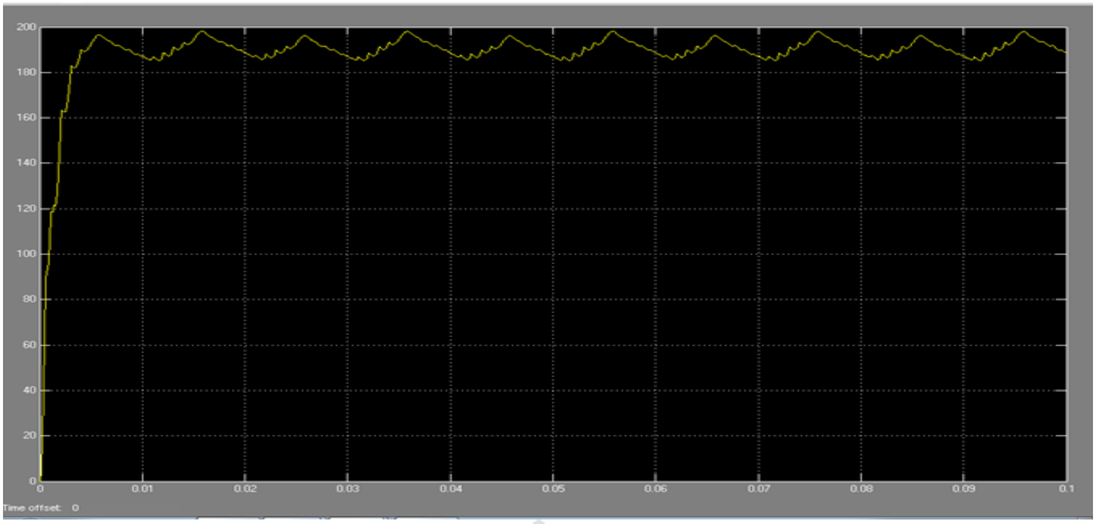

Fig:6 Input Voltage

V.CONCLUSON

The resonant frequency control as well as the var compensation schemes was projected to augment the contactless coupled transformer coupling efficiency. To regulate output voltage, the procedure frequency of inductive coupling power transfer can be moved away resonant frequency. Contactless Energy Transfer transfers energy by means of contactless non-metal means, for instance electromagnetic coupling, capacitive coupling, as well as light. A new inductive coupling power transfer topology was put forward to get better the power factor, output voltage regulation as well as effectiveness which are mostly constructed by a voltage controllable power factor corrector as well as a LLC resonant circuit. Using projected voltage controllable power factor corrector, the functions of power factor improvement as well as output voltage regulation can be attained at similar time. Although multi-stage inductive coupling power transfer building works well under steady normal loading circumstances, it can cause important conduction as well as switching losses at light or else no-load conditions, and create the controller inappropriate for realistic applications. The voltage gain of inductive coupling power transfer at resonant frequency is changed when the load is altered and the output voltage is not steady. The contactless energy transfer system permit removal of cables, slip as well as sockets, ensuing in unlimited maintenance-free procedure and improved reliability as well as safety. The voltage gain of inductive coupling power transfer at resonant frequency is changeable when the load is altering. Although the switching capacitor/inductor control reaction is slow, and resonant current augment when altering the features of resonant tank.

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