Power Factor Corrected Zeta Converter Based Improved Power Quality Switched Mode Power Supply

Abstract

Introduction:
Switched Mode Power Supply (SMPS) is an integral part of the computer that converts ac to multiple numbers of suitable dc voltages to impart power to different parts of the PC. It contains a diode bridge rectifier (DBR) with a capacitor filter followed by an isolated dc-dc converter to achieve multiple dc output voltages of different ratings. The uncontrolled charging and discharging of the capacitor result in a highly distorted, high crest factor, periodically dense input current at the single phase ac mains; this violates the limits of international power quality (PQ) standards such as IEC 61000- 3-2. Further, the neutral current in the distribution system increases if these PCs are used in large numbers which creates serious problems like overloading the neutral conductor, noise, de-rating of the transformer, voltage distortion etc.

Existing system:
An AC-DC Zeta converter topology is used for providing regulated DC voltage to feed the voltage source inverter (VSI) employed in the direct torque controlled PMSM drive. The proposed converter provides improved power quality in terms of low total harmonic distortion (THD), reduced crest factor (CF) of the AC supply current, high power factor of the AC mains and regulated output DC voltage.

**Proposed system:**

This paper presents power quality improvement in a multiple output SMPS that yields regulated dc output voltages irrespective of line and load variations. A Zeta PFC converter is still unexplored for the development of computer SMPSs that are capable of drawing a purely sinusoidal current with unity PF, offering low rippled output which is the prime requirement of PCs.
Advantages:

- Mitigate power quality problems.

Applications:

- Personal computers (PCs)

Tools and software used:

- MPLAB – microcontroller programming.
- ORCAD – circuit layout.
- MATLAB/Simulink – Simulation.