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Performance analysis of single phase induction motor due to non-linear loading in domestic power network

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The modern lighting fixtures are mostly non-linear in nature. The domestic power network is comprised of lighting loads and motors loads (house hold appliances). The non-linear light sources produce distortion in the supply lines. The house hold appliances mostly using single-phase induction motor is connected to the same feeder. The paper investigates the effect of distorted supply on the performance of single-phase induction motor. The non-linear light load is simulated using thyristor based converters with variable firing angles. Effects on stator current distortion, speed, torque and efficiency of single-phase induction motor is investigated. Comparison is done for pure sine wave supply and distorted supply conditions. It is observed that the ripple in torque increases due to increased distortion in the supply voltage that introduces ripple in speed too. The active power, apparent power and reactive power requirement is also increased when the supply is distorted. The efficiency also reduces slightly (nearly 1.5%) due to distortion in the supply voltage.

Biography

Ajad Hossain Howladar is an undergraduate Electrical Engineering student at Qatar University. He is the Team Manager of Qatar University EE Shell Eco Marathon Team and a Team Member of QU English Debate Club. He has published one paper as a first author at "Ninth International Conference on Ecological Vehicles and Renewable Energies, EVER14" held during March 25-27, Monaco. Some of his other achievements are: Students Achievement Award, 2014, 1st place in the GCC [Gulf Cooperation Council] Design Competition, 2014, 3rd place in UREP [Undergraduate Research Experience Program] Poster Presentation, and 5th place in 3D Modeling Competition, HOCHTEF Vicon Qatar.

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