

Analysis of One Phase Special Electrical Machines using Finite Element Method

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Abstract—Generally three phase motors are better than single phase motors but three phase system cannot be used in many applications for house. Especially single phase motors are used in city centers because of structure of the single phase feeder system. In general, small powered single phase motors in the range of 0.18 - 1.5 kW are used in small workplaces, portable hand looms, homes, fans, kitchen equipment, vacuum cleaner, drills and etc. In this paper, characteristic performance features of the single phase electrical machines that named universal motors, single phase induction motors, shaded pole motors and 24 V permanent magnet DC motors are studied. These motors are grouped in special electrical machines. Operational principles of the motors, areas of the usages and performance characteristics are given comparatively. Tests are conducted for motors. Current, voltage, revolution per minute, powers are given in graphs.

ANSYS Maxwell programme is used for computer aided design of transient motor performances. Electrical characteristics of the motors are simulated with programme. Dynamical transient analysis of the motors are conducted respectively. It should not be forgotten that the data, graphs and tables obtained will help the students to learn the motors better in the Special Electrical Machines Course and Laboratory.

Keywords— Special electric machines; performance analysis;maxwell; finite element analysis; dynamic analysis.

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