)esign Solutions to Minimize Iron Core Loss in Synchronous Reluctance Motors

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***tract* - This paper deals with an automatic design procedure for the nization of iron core loss in a synchronous reluctance motor ₹M). The focus of this paper is the design relative to hysteresis loss e basis of rotor shape in a SynRM.**

: coupled Finite Elements Analysis (FEA) & Preisach model has used to evaluate the iron core loss with rotor shape. The proposed dure allows to define the rotor geometric dimensions starting from kisting motor or a preliminary design. The iron loss has been sed with a rotor design optimisation.

I. Introduction

/nchronous Reluctance Motor (SynRM) present many adage if compare to induction motors that concern the simrugged rotor design, no rotor cage and consequently no per losses and no rotor parameters to be identified.

sues such as efficiency and torque/ampere are important valuating the performance of an electric machine. Such acteristics depend upon the losses and saturation behavior ie machine and therefore require a numerical evaluation.

high-speed applications, hysteresis loss can become the or cause of power dissipation. Therefore, whereas in other ls of machines a rough estimation of hysteresis loss can be epted, their importance in a SynRM justifies a greater efin calculating them more precisely [1-3].

ie paper presents an automatic procedure for the optimion of the motor design that combined Finite Element ilysis (FEA) with Preisach model and an optimisation tine. The modeling of motor takes into account the saturai and hysteresis phenomena.

II. Analysis Model And Design

he study concerns the SynRM with rotor flux barriers that sent, repect to the axially laminated one, a simplicity in the chanical construction, lower manufacturing cost, and the or skewing possibility.

tarting from a standard motor of Fig. 1, several optimized signs have been found according to design stateges of ;.2.

And the system matrix of model is described as follows:

$$[K]\{A\} + \{F\} + \{M\} = 0 \tag{1}$$

Where $\{M\}$ is magnetization calculated by Preisach model.

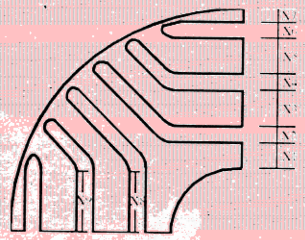

Fig. 1 Analysis model and design independent variables

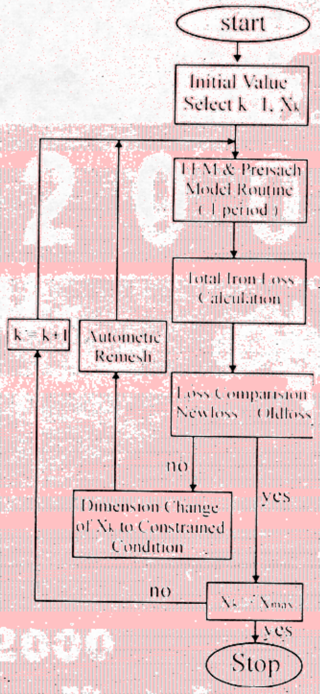

Fig. 2 Design procedure

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