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AN EFFECTIVE MODELLING METHOD BASED ON MLP-BASED ARTIFICIAL NEURAL NETWORKS FOR OBTAINING V-CURVE CHARACTERISTICS OF SYNCHRONOUS MOTOR

AHMET GANI[a], MUSTAFA TEKIN[a]*, O.FATIH KECECIOGLU[a], HAKAN ACIKGOZ[b], MUSTAFA SEKKELI[a]

[a]KAHRAMANMARAS SUTCU IMAM UNIVERSITY
[b]KILIS 7 ARALIK UNIVERSITY

*mustafa_tekin40@hotmail.com

Abstract:

System models are created based on the data obtained from applications or mathematical expressions. Modelling plays a vital role in the determination of dynamic behaviors in a system. Artificial neural networks have been widely used in the modelling of complex and non-linear systems. Various studies have focused on the use of artificial neural networks for system identification and modelling. Multilayered artificial neural networks with a feed-forward and non-linear structure are often used in various applications such as image recognition, classification, system modelling, function approximation, and the estimation of chaotic time series. Multilayered artificial neural networks is the most commonly used type of artificial neural networks in the solution of non-linear problems. Synchronous motor is an alternative current motor in which rotor rotational speed is equal to the rotational speed of the stator rotating field and the rotation speed does not vary in loading. When excitation current of the synchronous motor changes, it absorbs ohmic, inductive and capacitive current from the grid. In a synchronous motor operating at a constant load and voltage, the characteristic which yields the relationship between excitation current and stator current is called V-current. This study proposes an effective modelling method via multilayered artificial neural networks by obtaining excitation current and current load data comprising V-curve characteristics of the synchronous motor in Matlab/Simulink. The proposed modelling method can be applied to all characteristics of the synchronous motor.

Keywords: Modeling, Synchronous Motor, Artificial Neural Network