DOI: https://doi.org/10.15407/techned2020.05.040

FORMING THE INDUCTION MOTOR TORQUE WHEN STARTING

Journal	Tekhnichna elektrodynamika
Publisher	Institute of Electrodynamics National Academy of Science of Ukraine
ISSN	1607-7970 (print), 2218-1903 (online)
Issue	No 5, 2020 (September/October)
Pages	40 - 44

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Abstract

It is known that when starting some technological mechanisms, the resistance moment can exceed the passport value by several times. The article shows the possibility of forming the maximum possible starting torque with a minimum value of the stator current, proposes the technique for determining parameters of the supply network when creating the maximum possible starting torque for an induction motor. The technique is the following sequence. The magnetization curve and its mathematical image (in the form of a polynomial) are determined for a more precise determination of machine parameters from experimental or passport data. Adequate values of influence factors (voltage and frequency) are determined to create a regression model on the dynamic mathematical model of an induction motor using an iterative method, changing the range and ratio of network parameters. The mathematical calculation of the regression model is performed with obtaining polynomial dependencies for Mn (U, f) and In (U, f) based on a given optimization criterion. The range of variation of U, f is determined from the polynomial Mn (U, f). Equating to the necessary value of the starting torque, from the passport data the author calculates the maximum permissible magnetic flux, with the mathematical dependence Φ = F (Iμ) and determines the value of U and f1 in the saturation region of the engine. The obtained values of the amplitude U and the frequency of the supply voltage f1 meet the optimization criterion In min. Based on the obtained values of U and f1, the author forms a control signal of a frequency-controlled induction motor to create the necessary starting torque. References 10, table 1.

Key words: heavy pick-up and start-up conditions, the magnetization curve, the mathematical model, regression mathematical model.

Received: 28.02.2020
Accepted: 04.05.2020
Published: 25.08.2020

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