

# Calculation of Linear Induction Motor Features by Detailed Equivalent Circuit Method With Taking Into Account Non-linear Electromagnetic and Thermal Properties

Fedor Sarapulov, Ivan Smolyanov, Fedor Tarasov  
Ural Federal University

sarapulovfn@yandex.ru, i.a.smlianov@urfu.ru, F.E.Tarasov@urfu.ru

## Abstract

The work considers the analysis of the calculation accuracy of linear induction motor features by detailed equivalent circuit with taking into account non-linear of electromagnetic and thermal parameters. Reducing computational load is achieved at the expense of considering the problem only in two spatial coordinates. Influence of the third coordinate taken into account by coefficient Bolton's for the equivalent electrical conductivity of the conducting layers of the domain in magnetic quasi-static problem. The heat problem considers short-term increased thermal loads on various parts of the linear electric motor. The method is validated by comparing results with the calculated data obtained by the finite element method. Experience in using such approach indicates the good convergence between calculation and experimental data.

## References

1. F. SARAPULOV; S. SARAPULOV; I. SMOLYANOV. Compensated linear induction motor characteristics research by detailed magnetic equivalent circuit. 2017 International Conference on Industrial Engineering, Applications and Manufacturing (ICIEAM).
2. F. SARAPULOV; V. FRIZEN; I. SMOLYANOV; E. SHMAKOV. Dynamic study of thermal characteristics of linear induction motors. 2017 15th International Conference on Electrical Machines, Drives and Power Systems (ELMA).
3. F. SARAPULOV; S. SARAPULOV; I. SMOLYANOV. Research of thermal regimes of linear induction motor. 2017 18th International Conference on Computational Problems of Electrical Engineering (CPEE).