# MODELING FEATURES OF THE AUTONOMOUS INDUCTION GENERATOR

**Markov V.S., Kriukova N.V., Honcharov Ye.V., Poliakov I.V.**
***National Technical University «Kharkiv Polytechnic Institute», Kharkiv***

It is known that autonomous induction generators can be used at small wind power plants. The difficulty that arises in the mathematical description of such an object is associated with the precise determination of the parameters of its magnetic circuit. The magnetization branch, which is characterized by such a parameter as the magnetization inductance $L_0$ or, which is the same, the mutual inductance of the stator and rotor, is the most complex section. It turns out that this inductance nonlinearly depends on the rotor rotation speed $L_0(n_2)$, and, with increasing speed above the no-load speed, this inductance decreases, and, consequently, the inductive resistance of the magnetization branch also decreases. But at the same time, reducing the speed below the no-load speed leads to a decrease in the magnetizing inductance. Thus, the maximum value of the magnetizing inductance $L_0$ corresponds to the no-load speed. Therefore, before creating a mathematical model, the dependence $L_0(n_2)$ should be determined.

The situation somewhat simplifies when modeling an autonomous induction generator is that the leakage inductances of the stator $L_1$ and rotor $L_2$ practically do not change. In numerous works devoted to the modeling of autonomous induction generators, the magnetizing inductance is assumed to be constant, which leads to a discrepancy between the computer experiment and the experimental data obtained on real equipment.

A model based on the representation of an autonomous induction generator like a transformer, that is, a *T*-shaped or *L*-shaped electric circuit, does not allow for correct modeling of transient processes and taking into account the actual number of excitation capacitors. All that such models allow is to obtain approximate expressions for finding the excitation frequency and analytical expressions taking into account the parameters of the generator relative to any variable, for example, the voltage across the capacitor or the stator winding.

The most promising approach to modeling an autonomous induction generator is modeling using dynamic links in the MATLAB program, and there are many opportunities for the most accurate description of all the features of the mathematical model. In particular, a similar schematic diagram is shown in Fig. 1

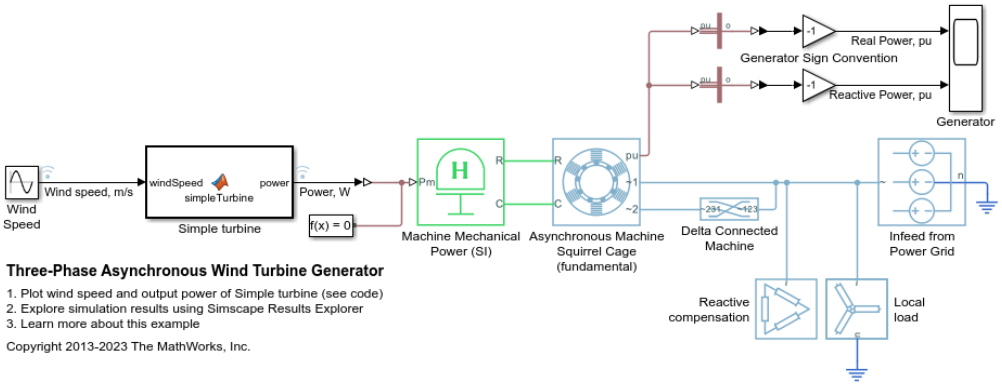


Figure 1 – The model shows an induction machine used as a wind turbine generator