Instructions for use of simulation models

Simulation models have been prepared in the GeckoCIRCUITS. To use them it is not necessary to have the above program, however, it is necessary to install the Java Runtime Environment (JRE), available at: http://java.com/download/

Downloading simulation model

To download the simulation model click one of the links in the Basic Course > exercises or Advanced Course> exercises tab. This displays a dialog to save the file to disk. Downloaded .jar file could be open and run in the JRE.

Design of simulation models

All models were prepared according to the same pattern. The window is divided into four areas:

1. *Scopes* – for presenting the results of the simulation,
2. *Electrical Drive* – diagram of the electrical part,
3. *Signal Measurements & Estimation* – measuring and estimation blocks,
4. *Control System*.

Performing the simulation

After opening the downloaded file, select Simulation> Init & Start from the menu. This will start the calculations, which percentage progress will be displayed at the top of the window. After the end of the simulation process a message will appear (Stopped after ... [s]).
The simulation results are shown after clicking the corresponding item from the *Scopes* area. Transients are divided into categories: *Control Signals*, *Mechanical Signals*, *Electrical Signals* and optionally *Space Vectors*.

Changing conditions of the simulation

Most simulation models comprises a control system operating in a closed loop. Input signal (reference) to the control system can be speed of the machine, electromagnetic torque, load torque and more. It is possible to determine the profile of the input signal changes over time. This is done in *speed_prof* block located in the *Control System* section (speed control reference) and optional in *load_prof* block located in the *Electrical Drive* section (*load torque reference*). Reference for the profile block is the nominal value of the physical quantity. After clicking the profile block it is possible to specify the following parameters:

- *v0* – initial value of the signal,
- *t1* – moment of the signal change,
- *v1* – value of the signal from the moment *t1*,
- *t2* – moment of the next change of the signal,
- *v2* – value of the signal from the moment *t2*.

Moments t1 and t2 are specified in seconds, whereas the values of v0, v1 and v2 are multiples of the input (nominal) value. After making changes in the profile block, it is necessary to restart the simulation. Analysis of the results is possible during and after the calculation process.