

New Multi Phase Quasi Static Fundamental Wave Electric Machine Models for High Performance Simulations

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A new quasi static fundamental wave machines library will be included in the magnetic domain package of the next Modelica Standard Library (MSL). The provided classes of machine models omit all transient electrical effects, but mechanical dynamics are fully taken into account. By including the new machine models new classes of problems can be treated, enabling fast electric machine and drive simulations. Yet, all the characteristic loss effects of transient machine models are fully taken into account, where needed. Phase numbers greater than three are supported. For each machine type available in the MSL there will then exist both a fully transient and a quasi static electric machine model.

The package structure of the quasi static fundamental wave package and the concept of implementation will be presented. All required assumptions and limitations for operating the new machine models will be presented and discussed. Deviating parameters compared to the transient machine models will be discussed and explained. Simulation examples will be presented and compared with transient simulation experiments. Possible applications for the new machine models will be outlined.

