



Switched Reluctance Machines

Switched reluctance machines run with reluctance torque and deliver power to windings in the stator. SRMs are used in appliances and vehicles, are considered uncoupled, and have a complex relationship between excitation current, rotor position, and flux linkages. OPAL-RT's solutions interface easily with modeling packages for finished components, like JSOL's JMAG-Studio, Infolytica's MotorSolve or Maxwell from Ansys. This improves high-precision testing and logging of the complex informational exchanges between the flux and other variables mentioned above.

Table: FPGA-Based Switch Reluctance Machine model overall specifications*

	SRM
Machine topology	3-phases (6/4, 12/8), 4-phases (8/6, 16/12), or 5-phases (10/8, 20/16) wye or delta connected
Maximum machine speed	100 kRPM @ 6/4
Maximum current / voltage / power / torque	Not limited
Minimum time step	125 ns
Calculation precision	Single Floating Point
Compatibility with JSOL's JMAG	Yes
Compatibility with ANSYS Maxwell	Yes
Compatibility with Infolytica's MotorSolve	Yes
Electrical machine parameters	Lookup table of phase current $I(\varphi, \theta)$ and torque $T(\varphi, \theta)$ or Flux $\varphi(I, \theta)$
Mechanical model	Friction and inertia model included on FPGA model. User can define their own model on CPU.
Current / torque table size	8 x 7 with linear interpolation
Cogging torque / current harmonics	Yes
Saturation vs current amplitude	Yes
Flux dependence on speed or temperature	Not supported

*The table describes the main specifications of the FPGA-Based SRM Machine model available on eFPGASIM. This model is typically used for an application requiring very fast simulation and accurate results. OPAL-RT also offers CPU-based models for slower applications and consultancy services to develop specific machine models.