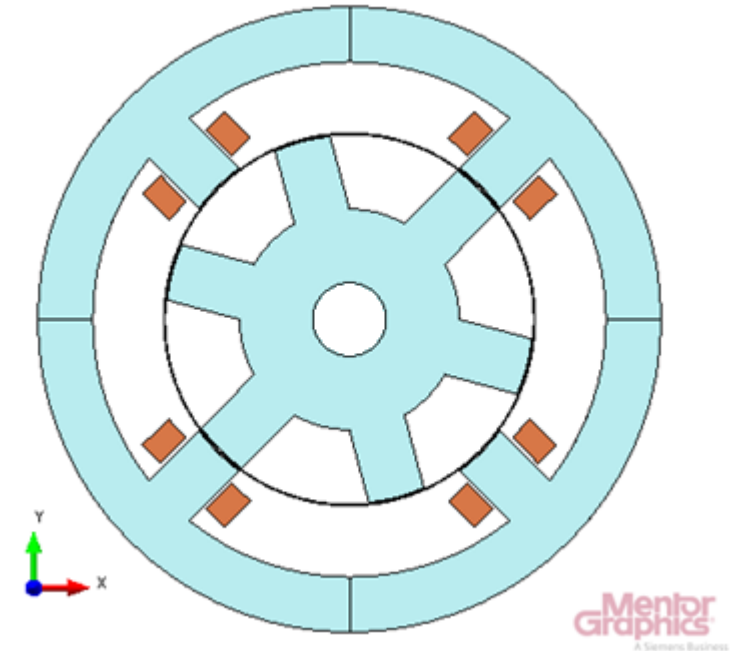


Switched Reluctance Motor: Comparing FEA with RSM

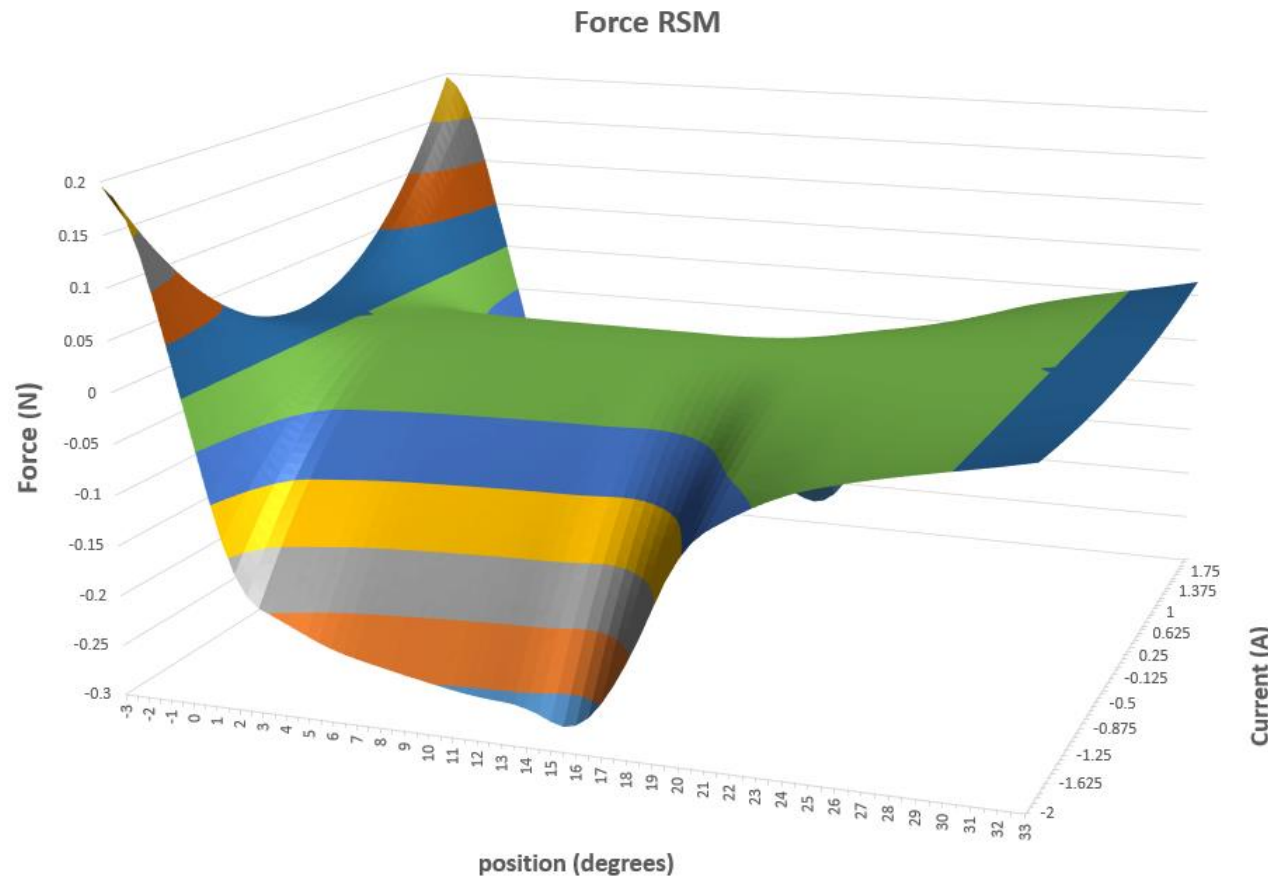
Switched Reluctance Motor: Comparing FEA with RSM

This application analyses a switched reluctance motor using two different methods: the Simcenter MAGNET Transient 2D with Motion solver, and a circuit simulator with a response surface model (RSM) created with the System Model Generator.

The device is set up so that the coils are switched depending on the position of the rotor. The analysis starts with the rotor stationary and at 10 degrees from the aligned position. A voltage source is switched on at $t = 0.01$ s, the rotor gradually accelerates, and the applied voltage is switched between the coils every 30 degrees of rotor rotation.

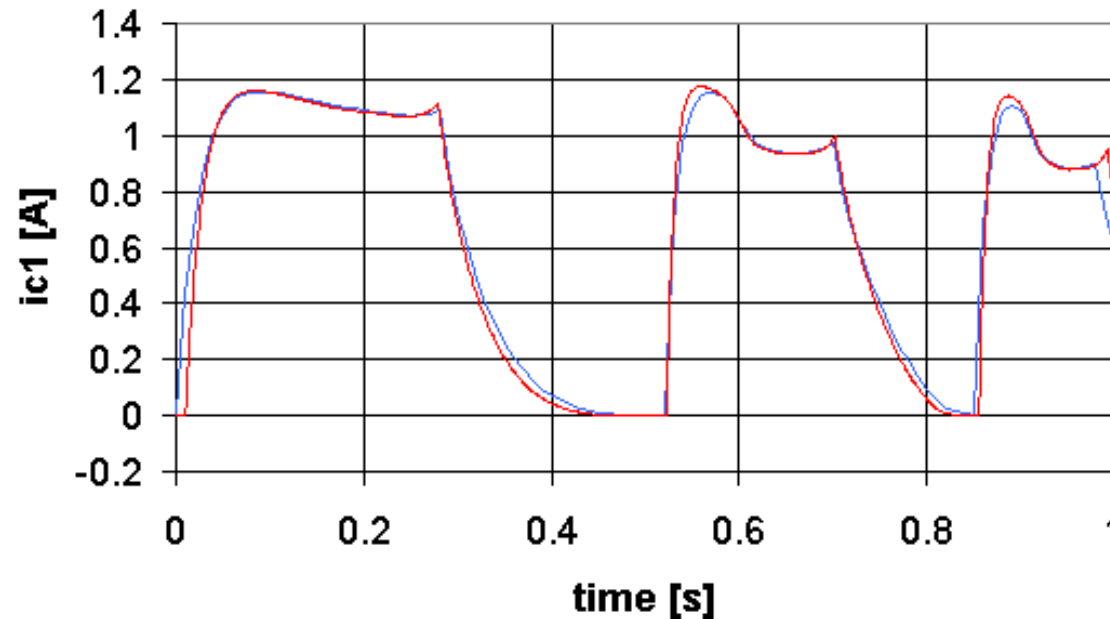


RESPONSE SURFACE MODEL FOR THE SRM'S TORQUE



A plot of the response surface model for torque created by the System Model Generator and used by the circuit simulator. A total of 120 solutions were required to generate this model.

COMPARING CURRENT IN THE COIL



This graph shows the current in the first pair of coils (one at 45 degrees and the other at 225 degrees) as a function of time. The result from the Transient 2D with Motion solver (blue trace) compares well with the circuit simulator's output (red trace), especially since the switching time depends on the position.