**Example from Simulink:**

This example shows how to control the rotor speed in a BLDC based electrical drive. An ideal torque source provides the load. The Control subsystem uses a PI-based cascade control structure with an outer speed control loop and an inner dc-link is fed by a controlled three-phase inverter. The gate signals for the inverter are obtained from Hall signals. The simulation uses speed steps. The Scopes subsystem contains scopes that allow you to see the simulationresults.

Wye-wound

Rotor:

Back EMF profile: Perfect trapezoid – specify maximum flux linkage

Maximum PM flux linkage: psim (Wb)

Rotor angle over which back EMF is constant: pi/(2\*p) (rad)

Number of pole-pairs: p

Zero sequence: Include

Rotor angle definition: Angle between the a-phase magnetic axis and the q-axis

Stator:

Stator self-inductance per-phase, Ls (H)

Stator inductance fluctuation: Lm, 0 H

Stator mutual inductance: Ms (H)

Stator resistance per-phase: Rs (Ohm)

Mechanical:

Rotor inertia: 0 kg\*m^2

Rotor damping: 0 N\*m/(rad/s)

Variables

D-axis current: beginning value: 0 A

Q-axis current: beginning value: 0 A

Torque: beginning value: 0 N\*m

Rotor speed: beginning value: 0 rpm

Rotor angle: beginning value: 0 deg

The objective is to control the motor speed as the following profile:

t=[0, 0.1] s, n=0

t=[0.1, 0.15] s, n=0 increases to 500 rpm linearly

t=[0.15, 0.35] s, n=500 rpm

t=[0.35, 0.5] s, n=500 rpm increases to 2000 rpm linearly

t=[0.5, 0.8] s, n=2000 rpm

t=[0.8, 0.9] s, n=2000 increases to 3000 rpm linearly

t=[0.9, 1] s, n=3000 rpm