

syncmc.gce

Attributes

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mainvars:
+ iqs ids ikq ifd ikd
+ vqs vds vfd wr tem
+ delta
auxvars: thetar costheta sintheta va vb vc thetarp
+ costhetap sinhetap
rparms:
+ lmq=0.0477 lmd=0.08228 ra=5.5 rkq=4.167
+ rkd=16 rfd=0.3096 poles=4 j=0.0581
+ b=0.00963 tl=0 lla=0.01639 llkq=0.05296
+ llkd=0.06226 llfd=0.01 v0=326.6

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Description

syncmc.gce is a synchronous machine model with iqs, ids, ikq, ifd, ikd, vqs, vds, vfd, wr, tem, delta as the general variables, and lmq, lmd, ra, rkq, rkd, rfd, poles, j, b, tl, lla, llkq, llkd, llfd, v0 as the real parameters. The model equations are given by

$$\begin{pmatrix} L_q & 0 & L_{mq} & 0 & 0 \\ 0 & L_d & 0 & L_{md} & L_{md} \\ L_{mq} & 0 & L_{kq} & 0 & 0 \\ 0 & L_{md} & 0 & L_{fd} & L_{md} \\ 0 & L_{md} & 0 & L_{md} & L_{kd} \end{pmatrix} \begin{pmatrix} \dot{i}_{qs} \\ \dot{i}_{ds} \\ \dot{i}_{kq} \\ \dot{i}_{fd} \\ \dot{i}_{kd} \end{pmatrix} = \begin{pmatrix} v_{qs} \\ v_{ds} \\ 0 \\ v_{fd} \\ 0 \end{pmatrix} - \begin{pmatrix} r_a & \omega_r L_d & 0 & \omega_r L_{md} & \omega_r L_{md} \\ -\omega_r L_q & r_a & -\omega_r L_{mq} & 0 & 0 \\ 0 & 0 & r_{kq} & 0 & 0 \\ 0 & 0 & 0 & r_{fd} & 0 \\ 0 & 0 & 0 & 0 & r_{kd} \end{pmatrix} \begin{pmatrix} i_{qs} \\ i_{ds} \\ i_{kq} \\ i_{fd} \\ i_{kd} \end{pmatrix},$$

$$T_{em} = \frac{3P}{4} [L_{md} i_{fd} i_{qs} + (L_d - L_q) i_{qs} i_{ds} + L_{md} i_{kd} i_{qs} - L_{mq} i_{kq} i_{ds}],$$

$$T_{em} - T_L = \frac{2J}{P} \frac{d\omega_r}{dt} + \frac{2}{P} B\omega_r.$$

AC behaviour is not implemented.