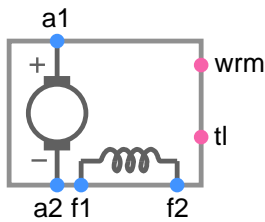


dcmc_1.ece



Attributes

```
mainnodes: a1 a2 f1 f2
outvar:
+   ia=cur(a1)_of_dcmc0
+   if=cur(f1)_of_dcmc0
+   tem=tem_of_dcmc0
stparms: wrm_st0=0 ia_st0=0 if_st0=0
main_var: wrm tl
iparms: compute_laf=0
rparms:
+   ra=0.5
+   la=1.5m
+   laf=1
+   j=0.25
+   b_damp=0
+   rf=1
+   lf=1m
+   v_rated=1
+   ia_rated=1
+   w_rprm=1
+   if_rated=1
```

Description

dcmc_1.ece is a DC machine model. **a1** and **a2** are the armature terminals, and **f1** and **f2** are field terminals. The general variable **wrm** is the mechanical speed in rad/s, and the general variable **tl** is the load torque.

The real parameters **ra** and **la** are the armature resistance and inductance, respectively.

Similarly, **rf** and **lf** are the field resistance and inductance, respectively. **j** is the moment of inertia, **b_damp** is the damping coefficient.

The real parameter **laf** is a proportionality constant (see the equations below). If **compute_laf** is 0, L_{af} is taken to be the same as the real parameter **laf**; if **compute_laf** is 1,

it is computed as follows.

$$L_{af} = \frac{V_a^{\text{rated}} - I_a^{\text{rated}} R_a}{I_f^{\text{rated}} N_{\text{rpm}}^{\text{rated}}},$$

where V_a^{rated} , I_a^{rated} , $N_{\text{rpm}}^{\text{rated}}$, I_f^{rated} are given by the real parameters `v_rated`, `ia_rated`, `w_rprm`, `if_rated`. Note that `w_rprm` is the rated speed in rpm.

The model equations are given by

$$\begin{aligned} e_b &= L_{af} I_f \omega_{rm}, \\ \tau_{em} &= L_{af} I_f i_a, \\ L_a \frac{di_a}{dt} + R_a i_a + e_b &= v_{a1} - v_{a2}, \\ L_f \frac{di_f}{dt} + R_f i_f &= v_{f1} - v_{f2}, \\ J \frac{d\omega_{rm}}{dt} &= \tau_{em} - \tau_L, \end{aligned}$$

The armature current i_a , the field current i_f , and the electromechanical torque τ_{em} are made available as output variables.

AC behaviour is not implemented.