s_indmc (subcircuit)

Attributes

```
inputs: va vb vc tl
outputs: wrm
e_left_nodes:
e_right_nodes:
e_top_nodes:
e_bottom_nodes:
parameters:
  i1_k: computed
  j: 0.089
  llr: 0.002
  lls: 0.002
  lm: 0.0693
  m1_k: computed
  poles: 4
  rr: 0.816
  rs: 0.435
  s1_k1: computed
  s1_k2: computed
  s2_k1: computed
  s2_k2: computed
  s3_k1: computed
  s3_k2: computed
  s4_k1: computed
  s4_k2: computed
  s6_k1: computed
  s6_k2: computed
  s7_k1: computed
  s7_k2: computed
  s8_k1: computed
  s8_k2: computed
  s9_k1: computed
  s9_k2: computed
  x2: computed
```

Description

s_indmc is an induction machine model represented by the following equations. Note that v_{ds} and v_{qs} are computed from v_a, v_b, v_c within this subcircuit, using abc_to_dq.xbe.

$$
\begin{aligned}
i_{ds} &= \frac{l_r}{l_m l_e}\psi_{ds} - \frac{1}{l_e}\psi_{dr}\,, \\[2mm]
i_{dr} &= \frac{1}{l_m}\psi_{ds} - \left(\frac{l_{ls}}{l_m}+1\right)i_{ds}\,, \\[2mm]
i_{qs} &= \frac{l_r}{l_m l_e}\psi_{qs} - \frac{1}{l_e}\psi_{qr}\,, \\[2mm]
i_{qr} &= \frac{1}{l_m}\psi_{qs} - = \left(\frac{l_{ls}}{l_m}+1\right)i_{qs}\,, \\[2mm]
T_{em} &= \frac{3}{4}\,l_m = \left(i_{qs}i_{dr} + i_{ds}i_{qr}\right)\,, \\[2mm]
\omega_r &= \frac{P}{2}\,\omega_{rm}\,,
\end{aligned}
$$

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$$\frac{d\psi_{ds}}{dt} = v_{ds} - r_s i_{ds} \, ,$$

$$\frac{d\psi_{qs}}{dt} = v_{qs} - r_s i_{qs} \, ,$$

$$\frac{d\psi_{dr}}{dt} = -\omega_r \psi_{qr} - r_r i_{dr} \, ,$$

$$\frac{d\psi_{qr}}{dt} = \omega_r \psi_{dr} - r_r i_{qr} \, ,$$

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