to be equivalent, the 2-spool equations have to give

\[ \tau_{b1} \tau_{e2} = 1 - \frac{\tau_{c1}}{\tau_{a}} (\tau_{c1} \tau_{c2} - 1) \]

Consider shaft 1 eqn,

\[ \tau_{b1} = 1 - \frac{\tau_{c1}}{\tau_{a}} (\tau_{c1} - 1) \]

\[ \Rightarrow \]

\[ \tau_{b1} \tau_{e2} = \tau_{b1} - \frac{\tau_{c1}}{\tau_{a}} (\tau_{c1} - 1) \]

but shaft 2 eqn gives \( \tau_{b1} \Rightarrow \)

\[ \tau_{b1} \tau_{e2} = 1 - \frac{\tau_{c1} \tau_{e2}}{\tau_{a}} (\tau_{c2} - 1) - \frac{\tau_{e2}}{\tau_{a}} (\tau_{c1} - 1) \]

\[ \tau_{b1} \tau_{e2} = 1 - \frac{\tau_{c1}}{\tau_{a}} \tau_{c2} + \frac{\tau_{e2}}{\tau_{a}} \tau_{c1} \]

\[ \Rightarrow \]

\[ \tau_{b1} \tau_{e2} = 1 + \frac{\tau_{e2}}{\tau_{a}} (-\tau_{c1} \tau_{c2} + 1) \]

or

\[ \tau_{b1} \tau_{e2} = 1 - \frac{\tau_{c1}}{\tau_{a}} (\tau_{c1} \tau_{c2} - 1) \]

\[ \square \]

From the point of view of cycle analysis, the 2-spool eqns are equivalent to the 1-spool eqn.