4.) Core mass flux eqn.

\[ m_C = \frac{1}{\sqrt{R}} \frac{\pi e \tau}{\sqrt{\frac{\pi e}{\tau}}} \frac{P_0}{\sqrt{T_0}} A_8 \]  \( \Box \)

\( \tau_e, \tau_f, \tau_r \) and \( A_8 \) are known.

so \( \Box \) is

\[ F_4 (m_C, \tau_e, \tau_r) = 0 \]  \( \Box \)

\( \Box - \Box \) are 4 eqns with unknowns \( \pi e, \tau_e, \tau_f, \tau_r, x \) and \( m_C = 5 \) unknowns.

\( \Rightarrow \) need an additional eqn. (not obvious).

Really need compressor and fan maps in order to know how \( \tau_C \) is related to \( \tau_C \) as engine rpm changes. i.e. to close the system, need

\[ \tau_C = \tau_C (\tau_C) \]

Parameterized by rpm.

\( \Rightarrow \) solve for \( \tau_C, \tau_C, \tau_f, x + m_C \)

\[ m_C + m_F = \frac{1}{\sqrt{R}} \frac{P_0}{\sqrt{T_0}} \left\{ \frac{\pi e}{\sqrt{\tau_e \tau_f}} + \frac{\pi e \tau_f}{\sqrt{T_e T_f}} + \frac{A_8}{\sqrt{T_e \tau_f}} \right\} A_8 \]

\[ \text{all known} \]