$$\alpha \left(T_{t3'} - T_{t2} \right) = T_{t4b} - T_{t5}$$

with aft burner off T_{t4b} is hot at limiting value $\Rightarrow$

$$\alpha \frac{T_{to}}{T_o} \cancel{\frac{T_{t2}}{T_{to}}}^{1} \left(\frac{T_{t3'}}{T_{t2}} - 1 \right) = \frac{T_{t4}}{T_o} \cancel{\frac{T_{t4a}}{T_{t4}}}^{1} \cancel{\frac{T_{t4b}}{T_{t4a}}}^{1} \left(1 - \frac{T_{t5}}{T_{t4b}} \right)$$

$$\alpha \tau_r \left(\tau_{c'_o} - 1 \right) = \tau_\lambda \tau_{ta} \left(1 - \tau_{tb} \right)$$

already have eqn for τ_{ta}, this is for τ_{tb}

$$\boxed{\tau_{tb} = 1 - \frac{\alpha \tau_r}{\tau_\lambda \tau_{ta}} \left(\tau_{c'_o} - 1 \right)} \quad (5)$$

Note: equations for aft burner off are same as turbofan — with possible exception of τ_t eqn.

$$\tau_t \triangleq \tau_{ta} \tau_{tb}$$

$$\tau_t = \tau_{ta} \left(1 - \frac{\alpha \tau_r}{\tau_\lambda \tau_{ta}} \left(\tau_{c'_o} - 1 \right) \right)$$

$$= \tau_{ta} - \frac{\alpha \tau_r}{\tau_\lambda} \left(\tau_{c'_o} - 1 \right)$$