

2) power balance

$$\tau_E = 1 - \frac{\tau_r}{\tau_A} \left[(\tau_c - 1) + \alpha (\tau_{c'} - 1) \right] \quad (2)$$

τ_E and τ_r are known, and

$$\tau_c = \pi_c \frac{v-1}{v} \quad \tau_{c'} = \pi_{c'} \frac{v-1}{v}$$

⇒ that (2) is

$$F_2(\tau_A, \pi_c, \alpha, \pi_{c'}) = 0 \quad (2)$$

↙ need α

3) bypass ratio eqn.

$$\alpha = \frac{\pi_{c'}}{\pi_E \pi_c} \sqrt{\frac{\tau_E \tau_A}{\tau_{c'} \tau_r} \frac{A_{g1}}{A_g}} \quad (3)$$

$\tau_E, \pi_E, \tau_r, A_{g1}$ and A_g are known

$$\tau_{c'} = \pi_{c'} \frac{v-1}{v}$$

⇒ (3) is

$$F_3(\alpha, \pi_c, \pi_{c'}, \tau_A) = 0 \quad (3)$$