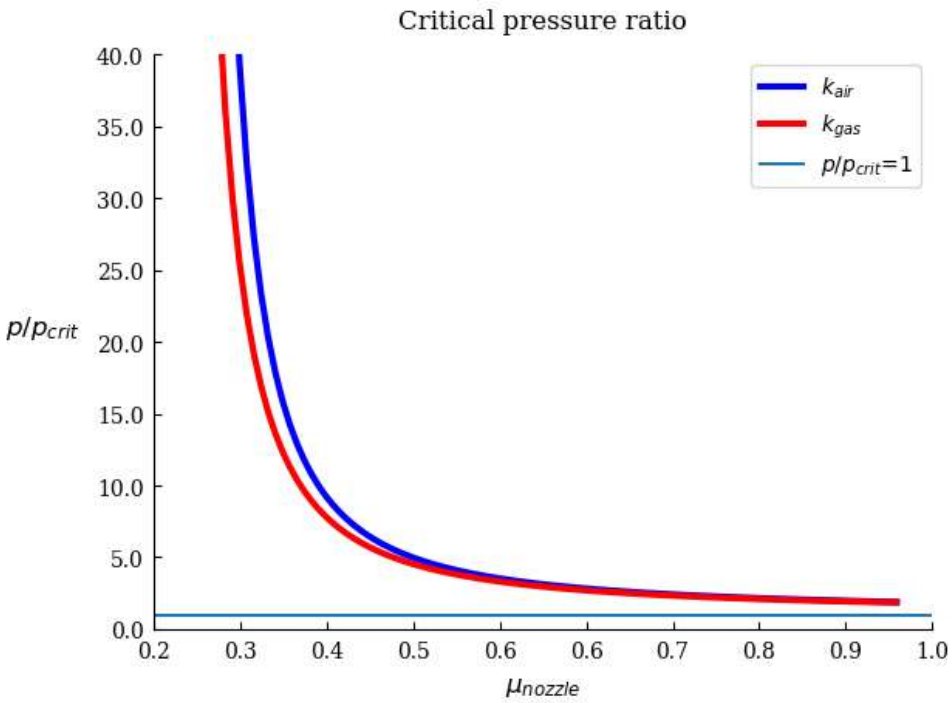
Development

Sunday, July 19, 2020 9:57 AM

- **Missing**
  - **Classes**
    - Turbojet
      - Check with old exams
    - Turboprop
      - Check with old exams
  - **Methods**
    - Combustion when T0_4 not given
    - Turbine work required
    - Specific fuel consumption
    - Turbomachinery calculations
      - rpm
    - Chemistry
  - **Flexibility**
    - μ_{nozzle}
      - $\mu_{nozzle_{core}}$
      - $\mu_{nozzle_{bypass}}$
    - μ_{mech}
      - $\mu_{mech_{LP}}$
      - $\mu_{mech_{HP}}$
      - $\mu_{gearbox}$
  - **Data input**
- **Issues**
  - **Turbine**
    - Total temperature, pressure from work
    - Observed
      - Higher pressure
      - Lower temperature
    - Checks
      - Formula
        - Pressure
    - HPT
      - Solved
    - LPT
      - Minor error
  - **Fan thrust**
    - Observed
      - Higher thrust
    - Formulas
      - Tried
        - $T_{fan} = \frac{\frac{\lambda}{\lambda+1} * \mu_{fan} * \mu_{mech} * W_{fan}}{v_0}$
          - μ_{fan} dubious inclusion
        - $T_{fan} = 2 * \dot{m}_{bypass} * (v_{fan\ nozzle} - v_0)$
    - Checks
      - Flow thrust works
        - $T_{fan} = 2 * \dot{m}_{core} * (v_{core\ nozzle} - v_0)$
  - **Critical pressure ratio**
    - From the formula sheet
      - $\frac{p_1}{p_2} = \frac{1}{\left(1 - \frac{1}{\mu_{nozzle}} * \frac{k_{gas}-1}{k_{gas}+1}\right)^{\frac{k_{gas}}{k_{gas}-1}}}$
      - Accurate
        - April 2019
      - Error
        - July 2019
          - Core flow nozzle not choked unexplained

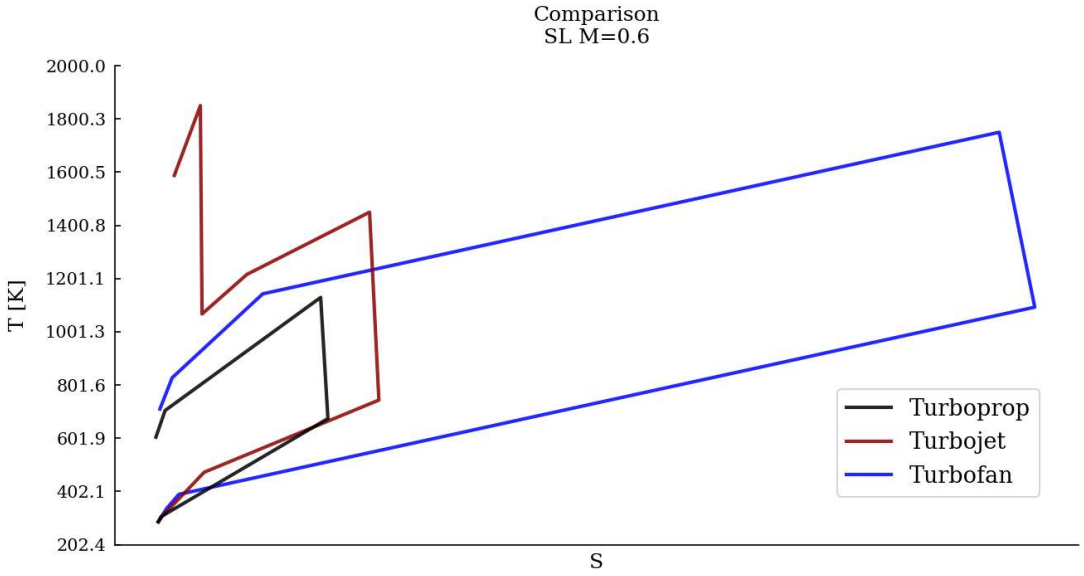


} Apparently always choked

- **Core exit velocity**
  - Accurate

- **Log**
  - **Turbofan**
    - Solved
      - HPT
    - Added functionality
      - Combustion chamber
        - Fuel $\dot{m}$ given
      - Record corrections
    - Issues
      - Critical pressure ratio
        - Accurate
          - April 2019
        - Flow always choked
          - July 2019 main flow not choked
    - Closed
      - Need to check critical pressure ratio with Victoria
  - **Turbojet**
    - Added functionality
      - Afterburner
      - Afterburner $\dot{m}$
    - Closed
      - Good progress
      - Need to check with old exams
        - Inlet
          - Temperature constant when $\Pi \neq 1$
  - **Turboprop**
    - Closed
      - Completed
      - Need to check with old exams
  - **Comparison**

    Pretty cool


Comparison
SL M=0.6
2000.0
1800.3
1600.5
1400.8
1201.1
1001.3
801.6
601.9
402.1
202.4
T [K]
S
Turboprop
Turbojet
Turbofan