

C.01.01.Z1 – Biblioteca Simplificada de Gás Ideal

Aplicação em FTHA – Finite Time Heat Addition Otto Engine Model

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<https://github.com/CNThermSci/ApplThermSci>

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Equação de Estado (EoS): Comportamento $P - T - v$

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Cada equação com forma nas bases **mássica**, e **molar**, com $R = \bar{R}/M$ — armazenar \bar{R} e M !

Modelo de $\bar{c}_p(T)$ Polinomial:

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Armazenar a_i , T_{min} e T_{max} e saber as conversões (i) $a_i \rightarrow b_i$ e (ii) $\bar{c}_{p,v}(T) \rightarrow c_{p,v}(T)$.

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$$\bar{u}(T) = \int_{T_{ref}}^T \bar{c}_v(T) dT = \int_{T_{ref}}^T \sum_{i=1}^4 b_i T^{i-1} dT, \quad T_{min} \leq T \leq T_{max} \quad \rightarrow$$

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Modelo de $\bar{c}_p(T)$ Polinomial: $P_r(T)$ e $v_r(T)$

$$\left(\frac{P_2}{P_1}\right)_s = \frac{P_{r2}}{P_{r1}} \qquad \left(\frac{v_2}{v_1}\right)_s = \frac{v_{r2}}{v_{r1}} \qquad \longrightarrow$$

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Padrões nos Cálculos:

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```
1 # Universal gas constant
2  $\bar{R}()$  = 8.314472 #  $\pm$  0.000015 # kJ/kmol·K
3
4 # Standard Tref
5 Tref() = 298.15 # K
6
7 # IG (Ideal Gas) structure: values for each gas instance
8 struct IG
9     MW                # Molecular "Weight", kg/kmol
10    CP::Ntuple{4}      # Exactly 4  $\bar{c}_p(T)$  coefficients
11    Tmin              # T_min, K
12    Tmax              # T_max, K
13    sref              #  $\bar{s}^\circ_{ref}$ , kJ/kmol·K
14 end
```



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