

C.01.01.Z1 – Biblioteca Simplificada de Gás Ideal

Aplicação em FTHA – Finite Time Heat Addition Otto Engine Model

Prof. C. Naaktgeboren, PhD



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

Compiled on 2020-09-09 06h15m33s UTC

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

$$Pv = RT$$

$$P\bar{v} = \bar{R}T \quad \rightarrow$$

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

$$Pv = RT$$

$$P\bar{v} = \bar{R}T \quad \rightarrow$$

$$P = \frac{RT}{v}$$

$$P = \frac{\bar{R}T}{\bar{v}} \quad \rightarrow$$

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

$$Pv = RT$$

$$P\bar{v} = \bar{R}T \quad \rightarrow$$

$$P = \frac{RT}{v}$$

$$P = \frac{\bar{R}T}{\bar{v}} \quad \rightarrow$$

$$T = \frac{Pv}{R}$$

$$T = \frac{P\bar{v}}{\bar{R}} \quad \rightarrow$$

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

$$Pv = RT$$

$$P = \frac{RT}{v}$$

$$T = \frac{Pv}{R}$$

$$v = \frac{RT}{P}$$

$$P\bar{v} = \bar{R}T \quad \rightarrow$$

$$P = \frac{\bar{R}T}{\bar{v}} \quad \rightarrow$$

$$T = \frac{P\bar{v}}{\bar{R}} \quad \rightarrow$$

$$\bar{v} = \frac{\bar{R}T}{P} \quad \therefore$$

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

$$Pv = RT$$

$$P = \frac{RT}{v}$$

$$T = \frac{Pv}{R}$$

$$v = \frac{RT}{P}$$

$$P\bar{v} = \bar{R}T \quad \rightarrow$$

$$P = \frac{\bar{R}T}{\bar{v}} \quad \rightarrow$$

$$T = \frac{P\bar{v}}{\bar{R}} \quad \rightarrow$$

$$\bar{v} = \frac{\bar{R}T}{P} \quad \therefore$$

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:

$$\bar{c}_p(T) = \sum_{i=1}^4 a_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \longrightarrow$$

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

$$\bar{c}_p(T) = \sum_{i=1}^4 a_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_p(T) = a_1 + a_2 T + a_3 T^2 + a_4 T^3,$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

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

$$\bar{c}_p(T) = \sum_{i=1}^4 a_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_p(T) = a_1 + a_2 T + a_3 T^2 + a_4 T^3,$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_v(T) = \bar{c}_p(T) - \bar{R} = \sum_{i=1}^4 b_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

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

$$\bar{c}_p(T) = \sum_{i=1}^4 a_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_p(T) = a_1 + a_2 T + a_3 T^2 + a_4 T^3,$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_v(T) = \bar{c}_p(T) - \bar{R} = \sum_{i=1}^4 b_i T^{i-1},$$

$$T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$b_1 = a_1 - \bar{R},$$

$$b_{i>1} = a_{i>1} \quad \therefore$$

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

$$\bar{c}_p(T) = \sum_{i=1}^4 a_i T^{i-1}, \quad T_{min} \leq T \leq T_{max} \quad \rightarrow$$

$$\bar{c}_p(T) = a_1 + a_2 T + a_3 T^2 + a_4 T^3, \quad T_{min} \leq T \leq T_{max} \quad \rightarrow$$

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

$$b_1 = a_1 - \bar{R}, \quad b_{i>1} = a_{i>1} \quad \therefore$$

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



Photo by Josh Sorenson from Pexels