

Pressure vs Altitude relationships

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The relationship:

$$P_{ht} = P_o \cdot e^{\frac{-M \cdot g \cdot ht}{R \cdot T_{sea}}}$$

The variables:

The atmospheric pressure at sea level

$$P_o := 101325 \cdot \text{Pa}$$

The average molecular mass of the atmosphere:

$$M := 0.02897 \cdot \text{kg} \cdot \text{mole}^{-1}$$

The altitude of interest (given as a matrix)

$$ht := 0 \cdot \text{m}, 20 \cdot \text{m}.. 100 \cdot 10^3 \cdot \text{m}$$

The average temperature at seal level

$$T_{sea} := 288 \cdot \text{K}$$

The gas law constant:

$$R := 8.314510 \cdot \text{joule} \cdot \text{K}^{-1} \cdot \text{mole}^{-1}$$

The function:

$$P(ht) := P_o \cdot e^{\frac{-M \cdot g \cdot ht}{R \cdot T_{sea}}}$$

The graph:

