

Thermodynamics

1 Thermodynamics Systems

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1.1 The state of a system and its transformation.

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$$f(p, V, t) = 0 \tag{1}$$

$$dL = pSdh \quad (2)$$

$$dL = pdV \quad (3)$$

$$L = \int_A^B pdV \quad (4)$$

$$L = \int_{V_A}^{V_B} pdV \quad (5)$$

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$$pV = \frac{m}{M}RT \quad (6)$$

$$pV = RT \quad (7)$$

$$\rho = \frac{m}{V} = \frac{Mp}{RT} \quad (8)$$

$$pV = \text{constant}.$$

$$\begin{aligned} L &= \int_{V_1}^{V_2} p dV = \frac{m}{M} RT \int_{V_1}^{V_2} \frac{dV}{V} \\ &= \frac{m}{M} RT \ln \frac{V_2}{V_1} \\ &= \frac{m}{M} RT \ln \frac{p_1}{p_2} \end{aligned} \tag{9}$$

$$L = RT \ln \frac{V_2}{V_1} = RT \ln \frac{p_1}{p_2} \tag{10}$$

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