

2016 年热力学与统计物理考研真题参考答案

$$\text{一、1、 } C_v = T \left(\frac{\alpha S}{\alpha T} \right)_v$$

$$\left(\frac{\alpha C_v}{\alpha V} \right)_T = T \left(\frac{\alpha}{\alpha v} \left(\frac{\alpha S}{\alpha T} \right)_v \right)_T = T \left(\frac{\alpha}{\alpha T} \left(\frac{\alpha S}{\alpha V} \right)_T \right)_v$$

$$= T \left(\frac{\alpha}{\alpha T} \left(\frac{\alpha P}{\alpha T} \right)_v \right)_v = T \left(\frac{\alpha^2 P}{\alpha T^2} \right)_v$$

2、已知 C_v 与温度无关

$$P = \frac{RT}{V-b} - \frac{a}{V^2}$$

$$\left(\frac{\alpha C_v}{\beta V} \right)_T = T \left(\frac{\alpha^2 P}{\alpha T^2} \right)_v = 0$$

因此 C_v 也与体积无关