

$$(1) \frac{d^2 n}{dx^2} = \left(-A \frac{n^3}{T^4} + \frac{5n}{2T^2} \left(\frac{dT}{dx} \right)^2 - \frac{2}{T} \frac{dn}{dx} \frac{dT}{dx} + B \frac{n^3}{T^{11/2}} \right)$$

$$(2) \frac{d^2 T}{dx^2} = A \frac{n^2}{T^3} - \frac{5}{2T} \left(\frac{dT}{dx} \right)^2$$

$$A=101.790189$$

$$B=0.006319$$

$$C = 13.024988$$

Boundary Conditions:

$$T=7 \quad \text{at } x=1$$

$$\frac{dT}{dx} = C \frac{n}{T} \quad \text{at } x=0$$

$$n=13 \quad \text{at } x=1$$

$$\frac{dn}{dx} = 0 \quad \text{at } x=0$$