$$\left(\frac{\partial u}{\partial T}\right)_X = C_X$$

$$\left(\frac{\partial u}{\partial T}\right)_Y = \left\{ \frac{C_Y - C_X}{\left(\frac{\partial X}{\partial T}\right)_Y} + Y \right\}$$

$$\left(\frac{\partial u}{\partial Y}\right)_X = C_X \cdot \frac{\left(\frac{\partial X}{\partial Y}\right)_T}{\left(\frac{\partial X}{\partial T}\right)_Y} = C_X \cdot \left(\frac{\partial T}{\partial Y}\right)_X$$

$$\left(\frac{\partial u}{\partial X}\right)_Y = \frac{C_Y}{\left(\frac{\partial X}{\partial T}\right)_Y} + Y$$

$$\left(\frac{\partial u}{\partial T}\right)_Y = C_Y + Y\left(\frac{\partial X}{\partial T}\right)_Y$$

$$\left(\frac{\partial u}{\partial Y}\right)_T = \left(\frac{\partial T}{\partial Y}\right)_X (C_Y - C_X) - Y\left(\frac{\partial X}{\partial Y}\right)_T$$

$$C_Y - C_X = T\left(\frac{\partial X}{\partial T}\right)_Y^2 \cdot \left(\frac{\partial Y}{\partial X}\right)_T$$