EX.2.7.2.b, Sauer3

Use the Taylor expansion to find the linear approximation $L(x)$ to $F(x)$ near x_0.

$$\text{(b)} \left(\begin{array}{ccccc} F: & \mathbb{R}^2 & \to & \mathbb{R}^2 \\ & \begin{pmatrix} u \\ v \end{pmatrix} & \mapsto & \begin{pmatrix} u + e^{u-v} \\ 2u + v \end{pmatrix} \end{array} \right) \qquad \text{at } x_0 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$