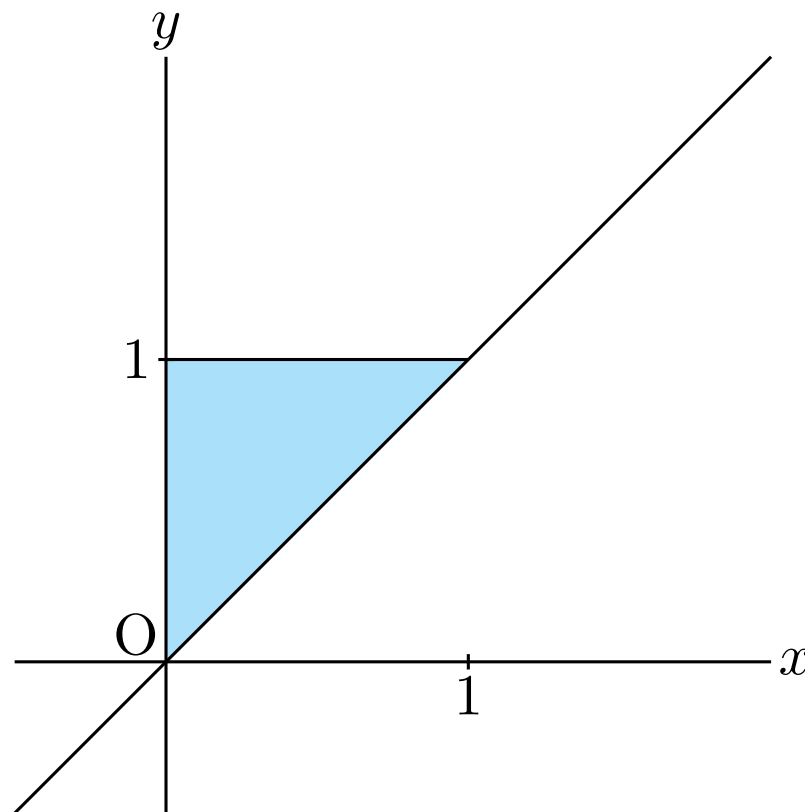


積分領域 D は図の通り.

$$\begin{aligned} & \iint_D y^2 e^{xy} dx dy \\ &= \int_0^1 \left\{ \int_0^y y^2 e^{xy} dx \right\} dy \\ &= \int_0^1 \left[ye^{xy} \right]_0^y dy \end{aligned}$$



$$= \int_0^1 (ye^{y^2} - y)dy = \int_0^1 ye^{y^2} dy - \int_0^1 y dy$$

第 1 項について

$$y^2 = t \text{ とおくと}$$

$$2ydy = dt$$

$$ydy = \frac{1}{2}dt$$

$$\begin{array}{c|c} x & 0 \rightarrow 1 \\ \hline t & 0 \rightarrow 1 \end{array}$$

$$\begin{aligned}\text{与式} &= \frac{1}{2} \int_0^1 e^t dt - \int_0^1 y dy \\ &= \frac{1}{2} \left[e^t \right]_0^1 - \left[\frac{y^2}{2} \right]_0^1 = \frac{e}{2} - 1\end{aligned}$$