<p align="center">**Multiple Integration**</p>
<p align="center">***Iteration of Double Integrals***</p>

Question

Calculate the given iterated integral.

$$\int_0^2 dy \int_0^y y^2 e^{xy} \, dx$$

Answer

$$\int_0^2 dy \int_0^y y^2 e^{xy} \, dx$$

$$= \int_0^2 y^2 \, dy \left(\frac{1}{y} e^{xy} \Big|_{x=0}^{x=y} \right)$$

$$= \int_0^2 y \left(e^{y^2} - 1 \right) dy = \frac{e^{y^2} - y^2}{2} \Big|_0^2$$

$$= \frac{e^4 - 5}{2}$$