

Problem 27

In each of Problems 25 through 28, determine whether the given integral converges or diverges.

$$\int_1^{\infty} t^{-2} e^t dt$$

Solution

Since the integrand diverges as $t \rightarrow \infty$, the integral does as well.

$$\begin{aligned} \lim_{t \rightarrow \infty} t^{-2} e^t &= \lim_{t \rightarrow \infty} \frac{e^t}{t^2} \\ &\stackrel{\infty/\infty}{=} \lim_{t \rightarrow \infty} \frac{e^t}{2t} \\ &\stackrel{\infty/\infty}{=} \lim_{t \rightarrow \infty} \frac{e^t}{2} \\ &= \infty \end{aligned}$$