

5.18. Because $(1 - e^{-\alpha x})e^{-\beta x}/x = \int_{\alpha}^{\alpha+\beta} e^{-yx} dy$,

$$\int_0^{\infty} \left(\frac{1 - e^{-\alpha x}}{x} \right) e^{-\beta x} dx = \int_0^{\infty} \int_{\alpha}^{\alpha+\beta} e^{-yx} dy dx = \int_{\alpha}^{\alpha+\beta} \int_0^{\infty} e^{-yx} dx dy = \int_{\alpha}^{\alpha+\beta} \frac{dy}{y}.$$