

### PROOF OF FORMULA 3.352.4

$$\int_0^{\infty} \frac{e^{-\mu x}}{x+b} dx = -e^{\mu b} \operatorname{Ei}(-\mu b)$$

The exponential integral is defined by

$$\operatorname{Ei}(x) = - \int_{-x}^{\infty} \frac{e^{-t}}{t} dt.$$

The change of variable  $t = x + b$  gives

$$\int_0^{\infty} \frac{e^{-\mu x}}{x+b} dx = e^{\mu b} \int_b^{\infty} \frac{e^{-\mu t}}{t} dt.$$

The change of variable  $s = \mu t$  produces the result.

**Note.** The parameters are restricted to  $b > 0$  and  $\mu > 0$ .