

**PROOF OF FORMULA 3.562.5**

$$\int_0^{\infty} x^2 e^{-\beta x^2} \cosh \gamma x \, dx = \frac{\sqrt{\pi}(2\beta + \gamma^2)}{8\beta^2 \sqrt{\beta}} e^{\gamma^2/4\beta} \operatorname{erf}\left(\frac{\gamma}{2\sqrt{\beta}}\right) + \frac{\gamma}{4\beta^2}$$

Entry 3.562.4 states that

$$\int_0^{\infty} x e^{-\beta x^2} \cosh \gamma x \, dx = \frac{\gamma}{4\beta} \sqrt{\frac{\pi}{\beta}} e^{\gamma^2/4\beta} \operatorname{erf}\left(\frac{\gamma}{2\sqrt{\beta}}\right) + \frac{1}{2\beta}.$$

The current integral follows by differentiating with respect to  $\gamma$ .