

PROOF OF FORMULA 4.261.11

$$\int_0^1 \frac{x^n \ln^2 x}{1+x} dx = 2 \sum_{k=n}^{\infty} \frac{(-1)^{k+n}}{(k+1)^3} =$$

The change of variables $x = e^{-t}$ gives

$$\int_0^1 \frac{x^n \ln^2 x}{1+x} dx = \int_0^{\infty} \frac{t^2 e^{-(n+1)t}}{1+e^{-t}} dt.$$

This integral is evaluated in 3.411.15.