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

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

This integral is evaluated in **3.411.15**.