

Solution 21.6

Analytical solution:

$$\int_0^3 x^2 e^x dx = \left[(x^2 - 2x + 2)e^x \right]_0^3 = 98.42768$$

Trapezoidal rule ($n = 4$):

$$I = (3-0) \frac{0 + 2(1.190813 + 10.0838 + 48.03166) + 180.7698}{8} = 112.2684 \quad \varepsilon_t = 14.062\%$$

Simpson's rule ($n = 4$):

$$I = (3-0) \frac{0 + 4(1.190813 + 48.03166) + 2(10.0838) + 180.7698}{12} = 99.45683 \quad \varepsilon_t = 1.046\%$$