

From Bohren and Huffman, p. 121,

$$S_2(180^\circ) = -S_1(180^\circ) = \frac{1}{2} \sum_n (-1)^n (2n+1)(a_{n1} - a_{n2})$$

$$Q_b = \frac{\sigma_b}{\pi a^2} = \frac{1}{x^2} \left| \sum_n (-1)^n (2n+1)(a_{n1} - a_{n2}) \right|^2$$

Exercises

- (1) For a sphere of radius $5 \mu\text{m}$ and real refractive index 1.59, use your code to provide graphs of Q_e , Q_s , Q_a , and Q_b as a function of size parameter for $\Im m = 10^{-6}$, .001 and .1 over $ka = [.01, 100]$.
- (2) Produce graphs of Q_e , Q_s , Q_a , and Q_b for a $5 \mu\text{m}$ silicon sphere over $\lambda = [280, 2500] \mu\text{m}$.
- (3) Compare Q_b with normal incidence reflectance from the bulk material.