

Implement the analytical formula for the reflectance from a semi-infinite medium: SemInfiniteTR.m

Implement a function calculating the Reflectance from a semi-infinite slab with Extrapolated-Boundary Conditions (EBC) under the Diffusion Approximation:

$$R(\rho, t) = -\frac{\exp\left(-\frac{\rho^2}{4Dvt} - \mu_a vt\right)}{2(4\pi Dv)^{3/2} t^{5/2}} \times \sum_{m=-\infty}^{+\infty} \left[z_{3m} \exp\left(-\frac{z_{3m}^2}{4Dvt}\right) - z_{4m} \exp\left(-\frac{z_{4m}^2}{4Dvt}\right) \right] \quad \begin{cases} z_{1m} = (1 - 2m)s - 4mz_e - z_s \\ z_{2m} = (1 - 2m)s - (4m - 2)z_e + z_s \\ z_{3m} = -2ms - 4mz_e - z_s \\ z_{4m} = -2ms - (4m - 2)z_e + z_s \end{cases}$$

- $m = 0$ (semi-infinite medium, only one image to satisfy the EBC)
- s is the thickness of the medium.
- $z_s = 1/\mu_s'$.
- $D = 1/(3\mu_s')$ is the diffusion coefficient.
- $v = c/n$ is the speed of light in the medium.
- $z_e = 2AD$ is the extrapolated distance.

You'll find a chunk of code that calculates the factor A.