Modelling Light Transport in Multilayered Nonhomogeneous Media Using Monte Carlo Method

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Understanding light transport in scattering media is crucial for applications in spectrophotometry across various scientific and technological domains. This report introduces a Monte Carlo method approach to model light transport in a scattering medium. The method is validated by experimental data. The outcomes of the simulations provide us with the opportunity to measure concentrations of chromophores in biological tissue or other optical parameters.

Modeling light transport with the Monte Carlo method is considered a random walk of photon packets, which obey probability density functions. These functions, on the other hand, are defined by parameters of the medium and the light itself. This method provides us with an opportunity to study complex processes of light absorption and scattering. Monte Carlo simulations yield valuable insights, such as fluence rate distribution, absorption spectra, and reflectance spectra. These outcomes offer a detailed analysis of the medium, with implications for medical and ecological applications, as well as for remote sensing of the Earth's surface using drones and other technological processes.

References

[1] Laser Phys. Lett. 5, No. 3, 217–219 (2008)