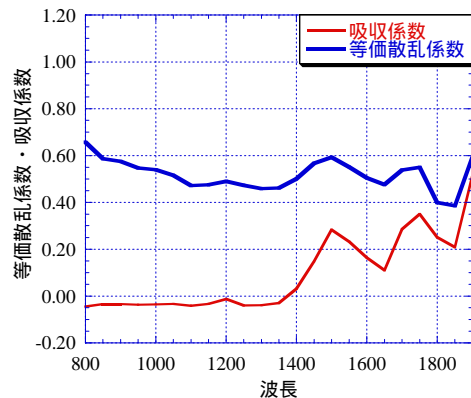


Measurement of the optical properties of nails

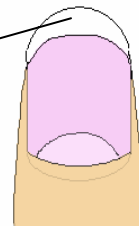
Diagnosis, treatment and bioinstrumentation using infrared light are being developed these days. However, strong scattering and weak absorption of light by biological tissues make it difficult to know light propagation in tissues. It is necessary to measure the optical properties such as the reduced scattering and absorption coefficients in order to know how light propagates in various biological tissues.

Optical Properties

We aim to measure the optical properties of nails. By an inverse Monte-Carlo method, which compares the results of experiment using a spectrophotometer with an integrating sphere and those of Monte-Carlo simulation, we obtain the reduced scattering and absorption coefficients.



Measured area (white area).



Inverse Monte-Carlo Method

< Monte-Carlo Simulation >

assume μ_a, μ_s' of sample

simulate light propagation by a Monte Carlo method

μ_a : absorption coefficient
 μ_s' : reduced scattering coefficient
 R : diffuse reflectance
 T : transmittance

calculate R, T

< Experiments >

measure R, T of sample

equal?

YES

NO

determine the assumed values as μ_a, μ_s' of sample