Optical Methods in Diagnosis

Homework #7 – multi-layered tissue model

Develop a multiple-layered model and compute R, T and the fluence rate distribution for

the tissue shown in the diagram below. Let r = z = 0.025 mm. Use variable weight

photons and Henyey-Greenstein phase function. Assume the incident light is a collimated

and normally incident beam

(A) Plot the absorption distribution of scattered photons (1/cm3) and the impulse response

(infinitely narrow incident beam) for the fluence rate of the scattered photons (1/cm2),

both in 2D (r and z).

(B) Assume that the incident beam’s irradiance has a Gaussian profile with an e-2 radius of

0.5 mm and a total power of 1W. Plot the fluence rate (W/cm2) in 2D (r and z). Report

the total reflectance R (should be approximately 0.21) and the total transmittance T

(should be about 0.01).

n0 = 1

n1 = 1.4

n2 = 1.4

n0 = 1

t1 = 0.05 mm

t2 = 2 mm

a1 = 37 cm-1, s1 = 480 cm-1, g1 = 0.79

a2 = 2.2 cm-1, s2 = 220 cm-1, g2 = 0.79







































