

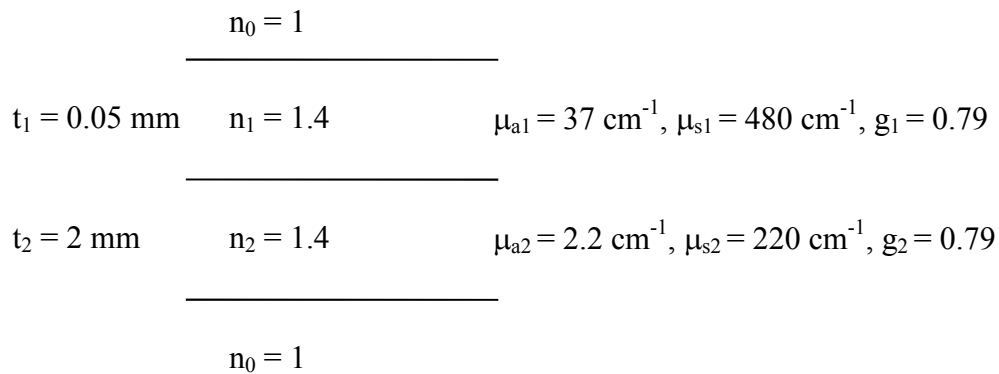
## Optical Methods in Diagnosis

2nd semester, 2015-2016

### Homework #7

#### Multiple-layer tissue model

Develop a multiple layer model and compute  $R$ ,  $T$  and fluence rate distribution for the tissue shown in the diagram below. Let  $\Delta r = \Delta z = 0.025$  mm. Use variable weight photons and Henyey-Greenstein phase function. Assume the incident light is a collimated beam at normal incidence.



- (A) Plot the absorption distribution of scattered photons ( $1/\text{cm}^3$ ) and the impulse response for the fluence rate of the scattered photons ( $1/\text{cm}^2$ ), both in 2D ( $r$  and  $z$ ).
- (B) Assume the incident beam having a Gaussian profile with an  $e^{-2}$  radius of 0.5 mm and total power of 1W. Plot the fluence rate ( $\text{W}/\text{cm}^2$ ) in 2D ( $r$  and  $z$ ). Total reflectance  $R$  is approximately 0.21 and total transmittance  $T$  is about 0.01.