

ECE 656: Fall 2009
Lecture 31 Homework

- 1) Problem 6.1, p. 271 of Lundstrom.

begin with:

$$P(t) = \Gamma_0 e^{-\Gamma_0 t}$$

$$\langle t_c \rangle = \int_0^{\infty} t P(t) dt / \int_0^{\infty} P(t) dt = \text{NUM/DEN}$$

$$\text{NUM} = \int_0^{\infty} t \Gamma_0 e^{-\Gamma_0 t} dt = \Gamma_0 \int_0^{\infty} t e^{-\Gamma_0 t} dt = \frac{1}{\Gamma_0}$$

$= 1/\Gamma_0^2$

$$\text{DENOM} = \int_0^{\infty} \Gamma_0 e^{-\Gamma_0 t} dt$$

$$= \Gamma_0 \times \frac{-1}{\Gamma_0} e^{-\Gamma_0 t} \Big|_0^{\infty} = 1$$

$$\langle t_c \rangle = 1/\Gamma_0 \checkmark$$