

UNIVERSITY OF TEXAS AT DALLAS
Department of Electrical Engineering

EE 4365 - Introduction to Wireless Communications Systems
Problem Set #2: Large-Scale Path Loss

Date assigned: 5/27/2004
Date due: 6/3/2004

Late homework will not be accepted. Please check the course web site for updates.

Reading: *Introduction to Wireless Systems*, ch. 2

Please use MATLAB to help you solve these problems, check answers, etc.

Problem 2.1

If the received power at a reference distance $d_0 = 1$ km is equal to 1 microwatt, find the received powers at distances of 2 km, 5 km, 10 km, and 20 km from the same transmitter for the following path loss models:

- a. Free space;
- b. $\nu = 3$;
- c. $\nu = 4$;
- d. two-ray ground reflection using the exact and approximate expressions; and
- e. Hata model for a large city environment.

Assume $f = 900$ MHz, $h_t = 40$ m, $h_r = 3$ m, $G_t = G_r = 0$ dB. Plot each of these models on the same graph over the range of 1 km to 20 km. (you can use MATLAB.) Comment on the differences between these models.

Problem 2.2

Problem 2 in chapter 2 of *Introduction to Wireless Systems*.

Problem 2.3

Consider the cell coverage under the assumption of the free-space propagation model. If it is required that the path loss at the cell border should not be larger than α dB, find an expression for the cell radius.