ECE 413/513 Homework 4

Be sure you have read Section 3.72 in your text and understand equations 3.29 through 3.40. These cover the typical case where the link loss scales at a rate greater than the square of the distance. If you have the first printing, be sure to review the errata.

Then please do problems 13 and 14 at the end of Chapter 3 in your text.

For problem 13:
(a) It is not necessary to submit this.
(e) consider “propagation loss” to be “path loss” as defined in eq. 3.38.

Please submit your solution as a single MATLAB (*.m) script file with a section for each problem that starts with the parameters from the problem statement clearly assigned to well-named variables at the beginning of your code block and then add computational and output code using those variables (without numerical values except an occasional integer constant like 4, 10, or 30 as appropriate) that outputs the results for each part of the problem to the command window. Please do not use symbolic math computations. Any change to your input parameter values should yield the expected results to your output. Each section of the code should be identified by problem and sub-problem number/letter as a comment. You might find the code line:

```
fprintf(1, 'n13(b) Cable Gain (dB) = %2.2f dBm', CableGaindB);
```

to be a useful example of a way to output results to the command window.

The results I get when I run your code should be virtually identical to the text shown below.

13(b) Cable Loss (dB) = 6.02 dBm
13(b) Cable Gain (dB) = -6.02 dBm
13(c) Power lost = 50.12%
13(d) Transmitter Power = 20.00 dBW = 50.00 dBm
13(e) Path Loss = 147.55 dB
13(f) Power received = 696.98 pW

14(a) Pr_dBm = -90.00 dBm
14(b) Pathloss = 134.51 dB
14(c) Linkloss = 107.51 dB
14(d) Pt = 17.51 dBm
14(e) Aperture area = 2.84e-02 square meters
14(f) x = 6.25e-10 meters^-2
14(g) Pt = 56.40 mW
14(h) Pt = 17.51 dBm
14(i) Power radiated = 17.51 dBm