

EE447 Lognormal fading

filename EE5447_lognormal fading.mcd
last edit date:9/15/09 avo

$$Q(x) := \frac{1}{2} \cdot \operatorname{erfc}\left(\frac{x}{\sqrt{2}}\right)$$

Guess value:

$$\text{Prob} := .1$$

$$x := .1$$

Given

$$\text{Prob} = Q(x)$$

$$xval := \text{Find}(x)$$

$$xval = 1.282$$

$$\sigma_p := 8$$

$$f_{\text{mar}} := \sigma_p \cdot xval$$

$$B := 2 \cdot 10^5 \quad \text{NF} := 6$$

$$\text{SNR} := 15$$

$$P_t := 44 \quad g_r := 2 \quad g_t := 4 \quad L_{\text{sys}} := 2$$

$$P_n := -174 + 10 \log(B) + \text{NF} \quad P_n = -114.99$$

$$f_{\text{mar}} = 10.252$$

$$P_{\text{min}} := P_n + \text{SNR} \quad P_{\text{min}} = -99.99$$

$$P_{\text{min}} := P_{\text{min}} + xval \cdot \sigma_p$$

$$L_p := P_t + g_r + g_t - L_{\text{sys}} - P_{\text{min}}$$

$$L_p = 137.737$$

***** LEE - Phili *****

$$P_1 := -70 \quad v := 3.68 \quad n := 30 \quad h_{t0} := 100 \quad h_{r0} := 10 \quad h_t := 100 \quad h_r := 5$$
$$P_o := 40 \quad f_o := 850 \quad d_o := 1 \quad f := 1800$$

$$g_{ro} := 2.15 \quad g_{to} := 8.15$$

$$\alpha_c := 20 \log\left(\frac{h_t}{h_{to}}\right) + 20 \log\left(\frac{h_r}{h_{ro}}\right) - n \cdot \log\left(\frac{f}{f_o}\right) + (P_t - P_o) + (g_t - g_{to}) + (g_r - g_{ro})$$

$$\alpha_c = -16.096$$

$$P_{50} := P_{\min}$$

Guess value:

$$d := 1$$

Given

$$P_{50} = P_1 - 10 \cdot v \cdot \log\left(\frac{d}{d_o}\right) + \alpha_c$$

$$\text{distance} := \text{Find}(d) \quad \text{distance} = 1.256 \text{ miles}$$

***** Coherence time example *****

Coherence time: $f_c := 1000\text{Hz}$ $A_1 := 1$

$i := 1 \dots 200$ $f_d := 25\text{Hz}$ $A_2 := 1$

$$t_i := \frac{i}{f_c \cdot 10}$$

$$s_1(t) := A_1 \cdot \cos(2\pi \cdot f_c \cdot t) \quad s_2(t) := A_2 \cdot \cos[2\pi \cdot (f_c + f_d) \cdot t]$$

