

Exercise 4 of Assignment 2 (due 1/23/08)

Consider the function $g_p(t) = 4 \cos^6(\pi t) + \sin^2(10\pi t)$.

- a) Show that $g_p(\cdot)$ is a periodic function, and find its Fourier representation. Hint: make use of part b of Exercise [1.3] and of the fact that the Fourier representation for a function must be unique.
- b) What is the discrete power spectrum for $g_p(\cdot)$?
- c) What is the m th order Fourier series approximation $g_{p,m}(\cdot)$ for this function?
- d) (Extra credit) Create plots (similar to those in Figure 61) showing how well $g_{p,m}(\cdot)$ approximates $g_p(\cdot)$ for $m = 1, 2$ and 4 .