

HW #11 Fall 2007

1. Let $[S]_{ij} \triangleq \frac{1}{\sqrt{K}} e^{j \frac{2\pi}{K} (i-1)(j-1)}$ $1 \leq i, j \leq K$.

Show that

$$E\{Y Y^H\} = I_K$$

if $E\{X\} = \mathbf{0}_{K \times 1}$ and $E\{X X^H\} = I_K$

2. Let the Tx data sequence $\{x[m]\}_{m=-\infty}^{\infty}$ is a sequence of uncorrelated random variables with mean zero & variance 1.

Then, its OFDM modulation without CP

show that

$$\sum_{m=-\infty}^{\infty} x[m] p(t - mT_c)$$

has the PSD $\frac{1}{T_c} |P(f)|^2$.