Wireless Communications Technologies

Course No: 16:332:546

Homework 2

1. Write down the series expansion for the Bessel function of order m of the first kind, $J_m(z)$
2. Write down Bessel's integral formula for the following functions and also sketch them.
   (a) $J_0(z)$
   (b) $J_1(z)$
   (c) $J_2(z)$
3. Write down the expression for the modified Bessel's differential equation of order m, $I_m(z)$. How is $I_m(z)$ related to $J_m(z)$?
4. Consider a zero-mean complex Gaussian random process $r(t)$ having the autocorelation function $\phi_{rr}(t)$.
   (a) Find the autocorrelation of $z^2(t) = |r(t)|^2$
   (b) Repeat part (a) when $r(t)$ has non-zero mean.