Assignment 10

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July 11, 2022

Contents

Question : Ex. 11.1 , Papoulis

Find $R_x[m]$ and the whitening filter of $x[n]$ if $S_x = \frac{\cos 2\omega}{12\cos 2\omega - 70\cos\omega + 62}$

Solution

Given, $S_x = \frac{\cos 2\omega}{12\cos 2\omega - 70\cos\omega + 62}$ We can write,

$$S_x(z) = \frac{5 - 2(z + 1/z)}{10 - 3(z + 1/z)} \tag{1}$$

$$= \frac{2}{3} + \frac{\frac{5}{9}}{\frac{10}{3} - (z + 1/z)} \tag{2}$$

Hence,

$$R[m] = \frac{2}{3} + \frac{5}{18}3^{-|m|} \tag{3}$$

$$\Gamma(z) = \frac{3z - 1}{2z - 1} \tag{4}$$