

# Assignment-6

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## Question

### **papoulis book exercise 4**

Q-4 The random variable is  $x$  in  $N(\eta, \sigma)$  and

$$P\{\eta - k\sigma \leq x \leq \eta + k\sigma\} = p_k.$$

(a) Find  $p_k$  for  $k = 1, 2$  and  $3$ .

(b) Find  $k$  for  $p_k = 0.9, 0.99$  and  $0.999$ .

(c) If  $P\{\eta - z_\mu\sigma \leq x \leq \eta + z_\mu\sigma\} = \gamma$ , express  $z_\mu$  in terms of  $\gamma$ .

# Solution

$$p_k - 2G(k) = 1 = 2erfk$$

(a) From Table 4-1

k =	1	2	3
$p_k =$	0.6827	0.9545	0.9973

(b) From Table 3-1 with linear interpolation:

$p_k =$	0.9	0.99	0.999
k =	1.282	2.32	3.090

$$(c) P\{\eta - z_\mu\sigma \leq x \leq \eta + z_\mu\sigma\} = 2G(z_\mu) - 1 = \gamma$$

$$\text{Hence, } G(z_\mu) = (1 + \gamma)/2 \quad \mu = (1 + \gamma)/2$$