CHAPTER VII

NORMAL DISTRIBUTION II AND OTHER DISTRIBUTION

EXERCISES VII **26.03.2002**

PROBLEM 1

Floods in a stream have the mean 600 m^3/s and the standard deviation 400 m^3/s. Answer the following questions assuming ***lognormal*** distribution.

a) What is the probability that the flood flow any year exceeds 700 m^3/s ?
b) What is the 100-year flood discharge ?

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EXERCISES VII **SOLUTIONS** **26.03.2002**

SOLUTION 1

a)

The values of the standard normal variable corresponding to 700, respectively, are computed as:

$\mu_Y = \ln\left[600/(400^2/600^2 + 1)^{0,5}\right] = 6,21 \quad \sigma_Y = \left\{\ln[(400^2/600^2) + 1]\right\}^{0,5} = 0,61$

$Y = \ln 700 = 6,55$

$Z = (6,55 - 6,21)/0,61 = 0,56$

From the table the following probability is taken;

F(Z) = F_1(Z)

$F(0,56) = F_1(0,560)$ ***= 0,2877***

b)

1 / 100 = 0,01 (the probability that the 100-year flood discharge)

$F_1(Z) = 0,01$

$Z \cong 2,325$

$Z = (Y - \mu_Y) / \sigma_Y$

$Z = (Y - 6,21) / 0,61 = 2,325$

Y = 7,63 m^3/s

X = 2059 m^3/s