

SMF PROBLEMS 10. 11.12.2017

Q1 (*Conditioning for the multinormal*).

State Edgeworth's theorem for the density of the multinormal law $N(\mu, \Sigma)$, in terms of the concentration matrix $K := \Sigma^{-1}$.

Given the formula for the inverse of a partitioned matrix (Problems 9 Q2):

(i) If a multinormal vector x is partitioned into x_1 and x_2 , with μ , Σ , K partitioned accordingly, derive the conditional distribution of x_1 given x_2 in terms of μ , K .

(ii) Give the same result in terms of μ and Σ .

Q2 (*Conditional independence and the concentration matrix*).

Show that two components x_i , x_j of a multinormal vector are conditionally independent given the other components iff $k_{ij} = 0$, where $K = (k_{ij}) = \Sigma^{-1}$ is the concentration matrix. (Take $i = 1$, $j = 2$, and x_1 in Q1 as the sub-vector of the first two components.)

NHB