

1. Without Maple, derive a formula for the PGF of a general hypergeometric distribution.
2. For a Markov model with parameters  $\mu$ ,  $\sigma$  and  $\rho$ , find the determinant and inverse of the variance-covariance matrix of  $n$  consecutive values of the corresponding process, after equilibration (you can do this by ‘guessing’ the general answer based on what happens when  $n = 3$ ,  $n = 4$  and  $n = 5$ , but then a formal proof of both results is required).

With the help of these two formulas, spell out the corresponding joint  $n$ -variate PDF *without* using matrix algebra (make clear what are the limits of each summation you may need for this purpose).