Title: Multivariate Normal Distribution

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Abstract: This bachelor thesis deals with the multivariate normal distribution, distributions derived from it and relations between them. The definition and characterization of the n-dimensional multinormal distribution, derivation of its characteristic function and definition of the matrix normal distribution are shown at the beginning. Further this thesis looks at the properties of the multivariate normal distribution and examines the linear combinations of normal vectors, linear combinations of normal matrices and theirs properties. After that the quadratic forms of matrices from the normal distribution are shown, which leads to the Wishart distribution, its properties and the analysis of multidimensional data based on it. At the end of the thesis, the combinations of random vectors and matrix from the normal distribution are examined, which results to the Hotelling distribution and its properties. The distribution and properties of the sample mean vector and sample covariance matrix of a random sample from n-dimensional multinormal distribution are presented in this thesis.

Keywords: normal distribution; Wishart distribution; Hotelling distribution