

**DOCTORAL (PHD) STUDIES
COURSE DESCRIPTION**

Course title	Field of science	Faculty	Institute
Multivariate Statistics	Mathematics (N 001)	Faculty of Mathematics and Informatics	Institute of Applied Mathematics
Study method	Number of credits	Study method	Number of credits
Lectures	0	Consultations	1
Individual work	4	Seminars	0

Course summary

In this course we study statistics related to multivariate normal distribution: Wishart distribution, estimates of covariance matrix, Hotelling T2 statistics, power of the test, Fisher's and non-central chi-square distributions, Linear and hierarchical linear models.

Main literature

1. Anderson T. W. *An introduction to multivariate statistical analysis (3 ed.)*. Wiley, New York, London, 2003
2. Rao S. R. *Linear Statistical Inference and its Applications (2 ed.)*. Wiley, 2001
3. Kendall M. *Multivariate analysis*. London, Charles Griffin Ltd, 1980
4. Johnson R. A., Wichern D. W. *Applied Multivariate Statistical Analysis (5 ed.)*. Prentice Hall, 2002
5. Rencher. A. C. *Methods of Multivariate Analysis (2.ed.)*. Wiley, 2002

Consulting teacher	Scientific degree	Pedagogical name	Main publications in the field of science of the last 5 year period
Vydas Čekanavičius	Habil. Dr.	Prof.	<ol style="list-style-type: none"> 1. V. Čekanavičius, P. Vellaisamy (2021). Compound Poisson approximations in p-norm for sums of weakly dependent vectors. <i>Journal of Theoretical Probability</i>, 34 (4), 2241–2264 2. V. Čekanavičius, P. Vellaisamy (2020). Lower bounds for discrete approximations to sums of m-dependent random variables. <i>Probab. Math. Stat.</i>, 40(1), 23–35. 3. V. Čekanavičius, P. Vellaisamy (2019). On large deviations for sums of discrete m-dependent random variables. <i>Stochastics</i>, 91(8), 1092-1108. 4. P. Vellaisamy, V. Čekanavičius (2018). Infinitely divisible approximations for sums of m-dependent random variables. <i>Journal of Theoretical Probability</i>, 31(4), 2432–2445. 5. V. Čekanavičius, P. Vellaisamy (2018). Approximating by convolution of the normal and compound Poisson laws via Stein's method. <i>Lithuanian Mathematical Journal</i>, 58(2), 127–140. 6. N.S. Upadhye, V. Čekanavičius, P. Vellaisamy (2017). On Stein operators for discrete approximations. <i>Bernoulli</i>, 23(4A), 2828–2859.
Remigijus Leipus	Habil. Dr.	Prof.	<ol style="list-style-type: none"> 1. Leipus, Remigijus; Paukštys, Saulius; Šiaulys, Jonas. Tails of higher-order moments of sums with heavy-tailed increments and application to the Haezendonck-Goovaerts risk measure // <i>Statistics and probability letters</i>. Amsterdam : Elsevier. ISSN 0167-7152. eISSN 1879-2103. 2021, vol. 170, art. no.108998, p. 1-12 2. Jokubaitis, Saulius; Celov, Dmitrij; Leipus, Remigijus. Sparse structures with LASSO through principal components: <i>International Journal of Forecasting</i> // <i>International journal of forecasting</i>. Amsterdam : Elsevier BV. ISSN 0169-2070. eISSN 1872-8200. 2021, vol. 37, iss. 2, p. 759-776.

			<ol style="list-style-type: none"> 3. Skorniakov, Viktor; Leipus, Remigijus; Juzeliūnas, Gediminas; Staliūnas, Kęstutis. Group testing: revisiting the ideas // <i>Nonlinear analysis: modelling and control</i>. Vilnius : Vilniaus universiteto leidykla. ISSN 1392-5113. eISSN 2335-8963. 2021, vol. 26, no. 3, p. 534-549. 4. Leipus, Remigijus; Philippe, Anne; Pilipauskaite, Vytautė; Surgailis, Donatas. Estimating long memory in panel random-coefficient AR(1) data // <i>Journal of time series analysis</i>. Hoboken : Wiley. ISSN 0143-9782. eISSN 1467-9892. 2020, vol. 41, iss. 4, p. 520-535. 5. Buteikis, Andrius; Leipus, Remigijus. An integer-valued autoregressive process for seasonality // <i>Journal of statistical computation and simulation</i>. Abingdon : Taylor & Francis Inc. ISSN 0094-9655. eISSN 1563-5163. 2020, vol. 90, no. 3, p. 391-411. 6. Leipus, Remigijus; Šiaulys, Jonas. On a closure property of convolution equivalent class of distributions // <i>Journal of mathematical analysis and applications</i>. San Diego, CA : Academic Press Inc. Elsevier Science. ISSN 0022-247X. eISSN 1096-0813. 2020, vol. 490, iss. 1, art. no. 124226, p. [1-8]. 7. Leipus, Remigijus; Šiaulys, Jonas; Vareikaitė, Ieva. Tails of higher-order moments with dominatedly varying summands // <i>Lithuanian mathematical journal</i>. New York : Springer Science+Business Media. ISSN 0363-1672. eISSN 1573-8825. 2019, vol. 59, no. 3, p. 389-407. 8. Leipus, Remigijus; Philippe, Anne; Pilipauskaitė, Vytautė; Surgailis, Donatas. Sample covariances of random-coefficient AR(1) panel model // <i>Electronic journal of statistics</i>. Cleveland : The Institute of Mathematical Statistics and the Bernoulli Society. eISSN 1935-7524. 2019, vol. 13, no. 2, p. 4527-4572.
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Approved by the Board of Faculty of Mathematics and Informatics 10/12/2021. Resolution No. (1.5 E) 110000-TPN-42

Board Chairman – assoc. prof. dr. Kristina Lapin