

**PhD research topic proposal**  
**BME, Doctoral School of Mathematics and Computer Science**

**Name of supervisor :**

Edith Alice Kovács

**Degree:**

PhD

**Title of the topic:**

Vine copula modelling in high dimension and applications

**Short description:**

Copulas are widely used in modelling multivariate probability distributions. Therefore, copulas play an important role in generating scenarios for different fields of research as finance, hydrology. Copulas make possible the modelling of the one-dimensional marginal probability distributions and the stochastic dependences between the random variables separately. Furthermore, they are efficient in the modelling of heavy tailed distributions, which are of great interest in the modelling of extreme events.

In higher dimension typically different type of dependences occur between different pairs of random variables involved. For this aim there were introduced the vine copulas, which can model many types of dependences between different pairs of random variables in the same time. However, this is also their drawback since the number of parameters becomes very large, as the dimension of the multivariate random vector grows. To reduce the large number of parameters the truncated vine copulas and the cherry-tree copulas were introduced. The candidate is supposed to do research in further developing the modelling of cherry tree copulas and truncated vines.

The candidate is supposed to have some routine in probability theory; furthermore, one of the tasks of the candidate is to deepen his/her knowledge by adding copula theory and some parts of information theory.

**Requirements:**

Introductory courses from algebra, probability theory.

**Contact:**

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**Place of work:**

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