

# CoE-MaSS weekly seminar series

THE DST-NRF CENTRE OF EXCELLENCE IN  
MATHEMATICAL AND STATISTICAL SCIENCES (CoE-MaSS)  
PRESENTS A SEMINAR BY

**Prof Carlos Coelho**

*(Mathematics Department, New University of Lisbon, Portugal)*

***“Near-exact distributions:  
closer to exact distributions than common  
asymptotic distributions”***

Friday, 12 April 2019

10h30-11h30

CoE-MaSS Seminar Room, 1<sup>st</sup> floor, MSB, Wits.



We are all quite familiar with the concept of asymptotic distribution. However, such asymptotic distributions yield approximations that commonly fall short of the precision we need for small samples. When developed for statistics that are used in Multivariate Analysis, asymptotic distribution may also exhibit some problems when some parameters in the exact distributions, namely the number of variables involved, grows even just moderately large, being the case that they never show an asymptotic behavior for increasing numbers of variables. Near-exact distributions are asymptotic distributions that lie much closer to the exact distribution than common asymptotic distributions. They are developed under a new concept of approximating distributions, based on a decomposition (i.e., a factorization or a split in two or more terms) of the characteristic function of the statistic being studied, or of the characteristic function of its logarithm. Then we keep untouched a good part of the original structure of the exact distribution of the random variable or statistic being studied and approximate asymptotically the remainder part. We may in this way obtain a much better approximation, which exhibits extremely good performances even for very small sample sizes and large numbers of variables involved, being asymptotic not only for increasing sample sizes but also (opposite to what happens with the common asymptotic distributions) for increasing values of the number of variables involved. A practical example is addressed and the very good performance of the near-exact distributions obtained is shown. **Email:** [cmac@fct.unl.pt](mailto:cmac@fct.unl.pt)

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Please ***mute your microphone*** so that there is no feedback from your side into the virtual room. During the Q&A slot you can then unmute your microphone if you have a question to ask the speaker. Thank you.

