On Multivariate Absorption and q-Hypergeometric Distributions

Malvina Vamvakari[*]

Abstract

In this talk a multivariate absorption and a multivariate q-hypergeometric distribution are considered. The multivariate absorption distribution emerges as a conditional distribution of a Heine process at a finite sequence of q-points in a time interval. Moreover, the multivariate q-hypergeometric distribution arises as a conditional distribution of the multivariate absorption. The aim of this talk is to present the asymptotic behaviour of the considered multivariate discrete q-distributions. Specifically, the pointwise convergence of the multivariate q-hypergeometric distribution as well as of the multivariate absorption distribution to a multivariate deformed Gaussian one, are provided.

References

[1] Charalambides, C.A.: Discrete q-Distributions. John Wiley Sons, New Jersey (2016)

[2] Charalambides, C. A.: q-Multinomial and negative q-multinomial distributions. Communications in Statistics - Theory and Methods 50, 5673-5898 (2021)

[3] Charalambides, C. A.: Multivariate q-Pólya and inverse q-Pólya distributions. Communications in Statistics - Theory and Methods 51(14), pp. 4854-4876 (2022)

[4] Kemp, A.: Heine–Euler extensions of the Poisson distribution. Comm. Statist. Theory Meth. 21, 571–588 (1992)

[5] Kemp, A.: Steady-state Markov chain models for certain q-confluent hypergeometric distributions. J. Statist. Plann. Inference 135, 107–120 (2005)

[6] Kemp, A.: Absorption sampling and the absorption distribution. J. Appl. Probab.35, 489–494 (1998)

[7] Kemp, A: A characterization of a distribution arising from absorption sampling. In Probability and Statistical Models and Applications, C. A. Charalambides, M.V. Koutras & N. Balakrishnan (eds.) 239–246. Chapman and Hall/CRC Press, Boca Raton, FL (2000)

[8] Kyriakoussis, A., Vamvakari, M.G.: Heine process as a q-analog of the Poisson process–waiting and interarrival times. Communications in Statistics - Theory and Methods 46, 4088-4102 (2017)

[9] Vamvakari, M.: On multivariate discrete q-distributions-A multivariate q-Cauchy's formula. Communications in Statistics - Theory and Methods 49, 6080-6095 (2020)

[10] Vamvakari, M.: Asymptotic behaviour of univariate and multivariate absorption distributions. In Randomness and Combinatorics, L. Ferrari & P. Massazza (eds.), RAIRO–Theoretical Informatics and Applications (to appear).

[*]Harokopion University, Department of Informatics and Telematics