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Asymptotics of looped cumulant lattices. Preliminary report.

A looped cumulant lattice is an array of multilinear functionals defined on an algebra of noncommutative polynomials. The characteristic property of looped cumulant lattices is that they are governed by a hierarchy of noncommutative partial differential equations known as the loop equations. This hierarchy can be solved recursively, allowing a complete determination of the asymptotics of LCLs. On one hand, LCLs arise as the correlation functions of several interacting random matrices, and on the other they are related to freeness and its higher-order generalizations. Therefore, LCLs constitute a very natural bridge between random matrices and free probability. This talk is based on joint work with Alice Guionnet. (Received September 11, 2013)