Hoeffding decompositions under exchangeability

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Since the pioneering work of Hoeffding in 1948, the so-called Hoeffding-ANOVA decompositions proved to be a very effective tool in obtaining limit theorems and have been widely used in various applications. In this talk, we outline the main elements of the theory of Hoeffding decompositions for (infinitely extendible) exchangeable sequences. We start by presenting a necessary and sufficient condition, due to G. Peccati, for an exchangeable sequence to admit such a decomposition. We then focus on sequences taking values in finite sets. In this framework, we derive a combinatorial characterization of the system of predictive probabilities of Hoeffding-decomposable exchangeable sequences and deduce two characterization results in terms of the associated de Finetti measures. These results, as well as one non trivial couter-example, will lead us to a brief discussion on quite an unexpected link between the notions of Hoeffding-decomposability and urn processes. We end the talk with an open problem concerning Polya sequences.