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SEMINAR

"Hoeffding decompositions and urn sequences"

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Abstract:

Let $X_{[1,\infty)} = \{X_n : n \geq 1\}$ be a sequence of random variables. We say that the sequence is *Hoeffding-decomposable* if, for all $n \geq 2$; any symmetric statistic $T(X_1, \dots, X_n)$ admits a unique representation as a sum of $(n+1)$ uncorrelated U-Statistics with completely degenerated kernels of increasing orders. Introduced for the first time in a seminal paper by W. Hoeffding in 1948, the so called *Hoeffding decompositions* grew to become one of the fundamental techniques for proving asymptotic distributional results. This has definitely been the case for i.i.d. sequences; as for dependent sequences, only extractions without replacement from finite populations (see Bloznelis and Götze [2001, 2002]) had been investigated before the theory was generalized to general exchangeable sequences in Peccati [2004]. In fact, in that reference a characterization of Hoeffding-decomposable sequences in terms of a technical condition the author named *weak independence* is obtained. In El-Dakkak and Peccati [2008], we seek a more transparent characterization of Hoeffding decomposable exchangeable sequences and focus on sequences taking values in a finite set D . In the case in which $D = \{0, 1\}$, we show that the only Hoeffding decomposable exchangeable sequences are i.i.d. sequences and two-colour Pólya sequences. When D is an arbitrary finite set, we obtain a partial generalization of the two-colour case. The full generalization is obtained in El-Dakkak, Peccati and Prünster [2009]: more precisely, we show that multicolour Pólya sequences are the only D -valued *purely* exchangeable sequences that are Hoeffding decomposable.