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Exchangeable distributions on FI^{op}-sets. Preliminary report.

We use the philosophy of FI-modules to generalize and strengthen classical theorems in probability on exchangeable distributions. An *exchangeable distribution* on an FI^{op}-set Σ is an element $\mu \in \lim \mathbb{P}\Sigma_T$. We give a general structure theorem for such exchangeable distributions based on the degree of cogeneration of Σ , by describing certain concrete data conditional on which any exchangeable distribution is “i.i.d.” Taking $\Sigma_T = 2^T$ this recovers de Finetti’s theorem (every exchangeable random sequence is a mixture of i.i.d. sequences according to some Bayesian prior); for $\Sigma_T = \{\text{partitions of } T\}$, Kingman’s theorem on random partitions; and for $\Sigma_T = 2^{\binom{T}{2}}$, the Aldous–Hoover theorem describing random graphs as mixtures of graphons. Compared with these classical results, the key advance is that the necessary data is given by concrete empirical statistics such as induced subgraph densities. (Received February 06, 2017)