PERSISTENT MEMORY BY FRACTIONALITY:
AN APPLICATION TO RANDOM GRAPH PROCESSES

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Fractionality in continuous time is usually achieved by suitable time-changes and it is commonly seen as a tool to extend Markov processes to models in which the presence of persistent memory is taken into consideration. Interestingly enough, these models are non-Markovian, still they represent a class of processes retaining a certain mathematical tractability. Even though the literature about continuous-time fractional processes is vast and growing, few studies on their discrete-time counterparts have appeared so far.

In this talk we present a theory for processes in discrete time admitting in some cases persistent memory. This is achieved by considering discrete infinite divisibility of random variables and defining time-changes resembling and actually converging to inverse subordinators. An example of a discrete-time renewal process having as a scaling limit the time-fractional Poisson process is described. Finally, as a possible application, a time-changed preferential attachment model is constructed and analyzed highlighting the differences with the classical model.

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