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**Title:** Graphical approach to generalized multivariate Hawkes processes

**Abstract:** In our earlier papers we introduced and studied multivariate generalization of Hawkes process (GMHP) that have important feature: they allow for explicit modelling of simultaneous occurrence of events coming from different sources i.e. different coordinates of the multivariate process. The GMHPs are multivariate point processes whose compensator depends on two directing kernels. The first kernel accounts for exogenous excitations and the second for endogenous excitations. In this talk we present our recent studies of GMHP. We introduce graphical formalism which allows to specify directing kernels in a concise and clear way. We use this graphical approach to study the problem of markovianization of the GMHP that is the problem of providing some conditions on the directing kernels which leads to intensities being a function of some Markov processes. We will also show that this approach, under some further specifications, leads to derivation of a system of ODE's for the Laplace transform of some functionals of the GMHP.