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Multivariate Frailty Models for Competing Risks

In this talk we extend Fine and Gray's model for the subdistribution of a competing risk to include multivariate frailties that are assumed to have a joint log-normal distribution. This extension allows for the modelling of situations where a more complex frailty structure is needed than the usual shared frailty. For example, when multiple frailty terms occur within each cluster, or when frailties are nested. Estimation is done using a penalized partial likelihood approach in combination with a Laplace approximation of the partial likelihood. The proposed method is then illustrated using bone-marrow transplantation data for acute myeloid leukemia.