Fitting bivariate avalanche distributions

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Abstract

This work uses the concept of "copulas" as a tool for understanding relationships among the bivariate law for the outcomes energy and duration, obtained in acoustic emission experiments. A copula is a function that links univariate marginal to their joint bivariate distribution. A particular case of Sklar's theorem states that every bivariate cumulative distribution function can be expressed in terms of its marginal and a copula. Moreover, if the marginal are continuous, then the copula is unique. The marginal described by the energy in acoustic emission experiments shows a law for extreme events, which is produced by the avalanches. That is the main approach for modeling the bivariate law by extreme value copulas. A comparison of several copulas fitting real data has been developed. The main results from Gumbel copula to Joe copula will be shown.