Semi-parametric modelling of trend in extremes

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Abstract

Assessment of trend has been a topic of major interest in extreme value analysis in recent years. Much of the previous work has focused on using parametric techniques to model trend in extremes. The parametric approach, however, is often not flexible enough for exploratory modelling. In this paper, we discuss and illustrate a semi-parametric method which can be used as an exploratory tool to draw more information about the extremes and to model trend in extremes. Our approach is based on local likelihood fitting of generalized extreme value distribution and related models. It aims to capture the pattern of trend by fitting locally weighted polynomials to the model parameters. We illustrate the application of this methodology in a study investigating changes in extreme temperatures in central England. Bootstrap methods are used to provide a measure of the variability of the fitted quantities.

Key Words: Bootstrap confidence bands; Generalized extreme-value distribution; Local likelihood; Return level; Semi-parametric modelling; Trend analysis.

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