Interval Analysis and the Search for local Maxima of the Log Likelihood for the Pearson III Distribution

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The Pearson III distribution (also known as a three parameter Gamma distribution) is often used in hydrology to approximate the distribution of maxima. One of the methods of parameter estimation used for this distribution is the Maximum Likelihood method. In 1995 Hideo Hirose gave an example with multiple local maxima. Interval analysis is a method that can be used to search for global minima. It has been applied for this purpose outside the field of hydrology, for instance to find parameters for the Weibull distribution. In this presentation interval analysis will be used to look for local minima in the log likelihood of the Pearson III distribution for several series of annual discharge maxima.