Entropy maximization based on inequality measures

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Abstract
The maximum entropy principle is a flexible and powerful tool for approximation of distributions. Hitherto a lot of work has been done in terms of maximum Shannon entropy based on inequality measures. Holm (1993) derived a family of maximum Shannon entropy density functions under side conditions on the mean and Gini index. Ryu (2008) determined the functional form of the share function via maximum Shannon entropy method under side conditions on the Bonferroni index. Eliazar and Sokolov (2010a) found the distribution that maximizes Shannon entropy subject to a given mean and Gini index. Also, Eliazar and Sokolov (2010b) obtained the distribution that maximizes Shannon entropy subject to a given mean and Pietra index. Recently, Khosravi et al. (2015) find the maximum Shannon entropy under the constraint on the mean and generalized Gini index. In this work, we find the maximum quadratic entropy distribution under the constraint on mean and generalized Gini index. We show among distributions supported on non-negative real line, the Pareto type II distribution with following survival function maximizes the quadratic entropy subject to a given mean and generalized Gini index,

\[ F(x) = \left(1 + \frac{x}{c}\right)^{-\frac{2}{\nu}}, \quad x \geq 0, \nu > 2. \]

References:

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