On the range of self-normalized Cramér type moderate deviations

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Abstract

In this talk we study the self-normalized moderate deviations for centered independent random variables with finite third or higher moments. With these moment conditions, we obtain the exact self-normalized tail probabilities for $x$ up to $x = o(n^{1/4})$. Consequently under some conditions for the third moment, the self-normalized moderate deviation probabilities hold uniformly in a $x$ range which is related to the moments with order between 3 and 4. This is a further study of the results in Shao (1999) and Jing, Shao and Wang (2003) where at most finite third moment is assumed. We also show the necessity of the third moment conditions in obtaining the self-normalized moderate deviation probabilities for $x$ outside the range of $[0, o(n^{1/6})]$. Further more, it is proved that the range $[0, o(n^{1/4})]$ is optimal under some third moment conditions. Additionally we give some exponential forms of Berry-Esseen bounds.

This is a joint work with Lin Ge.