

MODERATE DEVIATIONS FOR POISSON-DIRICHLET DISTRIBUTION

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Abstract: Poisson-Dirichlet distribution arises in many different areas. The parameter θ in the distribution is the scaled mutation rate of a population in the context of population genetics. The limiting procedure of θ approaching infinity is practically motivated and has led to new interesting mathematical structures. Results of law of large numbers, fluctuation theorems and large deviations have been successfully established. In this paper moderate deviation principles are established for Poisson-Dirichlet distribution, GEM distribution, the homozygosity, and Dirichlet process when parameter θ approaches infinity. These results combined with earlier work provide a complete picture of the asymptotic behavior of Poisson-Dirichlet distribution for large θ . The moderate deviation results also reveal some new structures that are not observed in results of large deviations.

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