

Prediction in Ewens–Pitman sampling formula and random samples from number partitions

Masaaki Sibuya

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Abstract Motivated by marine ecological data on species abundance, with the record of subsamples, two problems are investigated in this paper, assuming the Ewens–Pitman sampling formula: One is the prediction of the number of new species if the catch is continued, and the other is how the number of species will decrease in random subsamples. Related statistics and extended models are also considered. A tool for the work is the generalized Stirling numbers of three variables.

Keywords Bell polynomials · Gibbs partitions · Partition data · Pólya’s urn model · Random number partitions · Random sum models · Size index · Trawl fishery · Waiting time.