

Sequential Importance Sampling Algorithms for Estimating Tree Size

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Abstract

A great number of problems in mathematics, computer science, and the physical sciences can be solved by performing the same underlying task: counting the leaves of a decision tree. Such problems range from measuring the reliability of networks to predicting the efficiency of algorithms to counting the possible arrangements of molecules in lattices. Although finding an exact answer is extraordinarily difficult, many different combinatorial sampling algorithms exist to provide unbiased estimates.

This talk will provide an overview of Sequential Importance Sampling algorithms for estimating tree size, including Knuth's algorithm, Stratified Sampling, and Stochastic Enumeration. Examples will focus on counting linear extensions of partially ordered sets.

Keywords: sampling algorithm, stratified sampling, partially ordered set, linear extension.