

# On Higher-Order Probabilistic Computation

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Ideas and tools from probability theory are extremely useful in various areas of theoretical computer science, and become essentials in fields like cryptography, in which being able to flip from a fair coin is a necessity rather than a choice. Recently, there has been a growing interest in studying the role of higher-order functions in probabilistic computation. We give some hints about why this indeed deserves to be studied, focusing on cryptography and machine learning. We then overview the metatheory of a probabilistic lambda-calculus, highlighting the (striking) differences with the one of the pure, deterministic, lambda-calculus.