

Benfordness of Chains of Truncated Beta Distributions via a Piecewise Constant Approximation

Tippawan Santiwipanont, Songkiat Sumetkijakan, Teerapot Wiriakraikul

Abstract. A chain of truncated distributions is constructed from iteratively truncating an initial distribution on the right. We show that if the initial distribution is a piecewise constant approximation of the Beta distribution with parameters α and 1 then the mantissas of the chain of truncated distributions converge to a mantissa-limit distribution distinct from the Benford's law. For general approximating initial distributions, under some suitable conditions on these mantissas, we can conclude that the mantissa-limit distributions converge to the mantissa-limit distribution for the limiting initial distribution. As a result, we obtain an alternative proof of the fact that chains of truncated Beta distributions satisfy Benford's law in the limit.