The Central Limit Theorem for R, R^n, Stochastic Processes, and Triangular Arrays

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4/19/2011

The current, most widely-used proof of the Central Limit Theorem uses the nontrivial fact that weak convergence and the convergence of characteristic functions are equivalent. In our research, we are therefore investigating which CLT results we can prove directly from their respective defintions. In my last talk, I presented our proof of the CLT on R in which our i.i.d. consisted of random variables with only two values. Since that time, we have extended this result to a direct proof of the general CLT on R. Furthermore, we have proven a few natural extensions of this result, namely a CLT for stochastic processes and one for R^n in the case where our random variables are uncorrelated. In this talk, I will discuss some of the theory behind these results as well as our current pursuits, specifically the Lindeberg CLT for triangular arrays and a CLT for the sphere.