STANFORD PROBABILITY SEMINAR

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Monday, 16 May 2004
4:15pm (Refreshments at 4pm in the 1st Floor Lounge)
Sequoia Hall, Room 200

The conditional central limit question for stationary processes

Abstract. Let $\cdots X_{-1}, X_0, X_1, X_2, \cdots$ denote a stationary ergodic process for which the X_k have mean 0 and a finite positive variance. Further, let $S_n = X_1 + \cdots + X_n$ and $\sigma_n^2 = E(S_n^2)$ and suppoe that $\sigma_n \to \infty$ as $n \to \infty$. The conditional central limit question is whether the conditional distribution of S_n/σ_n given $\cdots X_{-1}, X_0$ converges to the standard normal distribution. There has been substantial recent progress on this question, leading conditions that are necessary and nearly sufficient. On one hand the conditions can be phrased in terms of growth restrictions on $E(S_n|\cdots X_{-1}, X_0)$. On the other, they may be phrased in terms of approximate solutions to Poisson's Equation for the Markov Chain $W_n = (\cdots X_{n-1}, X_n)$ and solutions to a fractional version of Poisson's Equation. This progress will be reviewed, and some current work described.