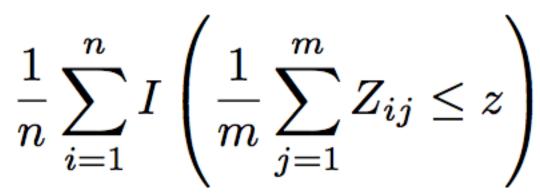
Finite-time Performance

- Asymptotics of simulation-optimization algorithms usually don't "kick in" early enough to be practically relevant
- How can one assess finite-time (nonasymptotic) performance?
- Let Z=f(X) be true obj value of solution X returned by optimization algorithm under given computational budget
- Estimate distribution function of Z

Optimal Choice of n and m?

- Get realizations of X by running optimization algorithm X_i i=1, 2, ..., n
- Estimate f(X_i) by running simulation at X_i giving (Z_{ij}: i=1, ..., n, j = 1, ..., m)
- Estimate distribution function at z as



Confidence bands (in z)?

Henderson Research Agenda

Detecting Structure

- Detect structure in problems based on estimated function values only
- Use a kind of hypothesis test
- Maximize likelihood of perturbed function values that ensure structural property holds
- Convexity, unimodality, monotonicity and others

Approximate DP and Sim Opt

- Approximately solve difficult dynamic programming problems
- Can implement greedy policy with respect to approximate value function V(x; a) $V(x; a) = \sum_{i=1}^{n} a_i V_i(x)$
- How to find good coefficients "a"?
- Regression, LP often advocated since fast and plausible

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Maybe Use Sim Opt Instead?

- But these methods don't always give best possible coefficients
- E.g., tetris example does factor of 20 better than best regression/LP method (Szita, Lorincz 06)
- We used direct search on an EMS problem, get far better performance
- Can we design specialized sim-opt algorithms for these kinds of problems?