Barry L. Nelson

Department of Industrial Engineering & Management Sciences

Northwestern University

nelsonb@northwestern.edu

http://www.iems.northwestern.edu/~nelsonb/

Ranking & Selection

- As a standalone simulation optimization tool when the number of alternatives is small enough that all of them can be simulated
  - Provide a probability of correct selection guarantee and inference on the differences among alternatives.
  - S. Kim and B. L. Nelson, "A Fully Sequential Procedure for Indifference-Zone Selection in Simulation," *ACM Transactions on Modeling and Computer Simulation* **11** (2001), 251-273.

Ranking & Selection

- To help simulation optimization search algorithms to make correct local-improvement decisions
  - J. Pichitlamken, B. L. Nelson and L. J. Hong, "A Sequential Procedure for Neighborhood Selection-of-the-best in Optimization via Simulation," *European Journal of Operational Research* **173** (2006), 283-298.

Ranking & Selection

- To “clean up” when a simulation optimization terminates to provide statistical inference
  - Probability selected alternative is the best of those simulated
  - Confidence interval on the true value of the selected solution
  - J. Boesel, B. L. Nelson and S. Kim, "Using Ranking and Selection to `Clean Up' After Simulation Optimization," *Operations Research* **51** (2003), 814-825.

Discrete-decision-variable simulation optimization

- Algorithms for adaptive random search with guaranteed convergence to a locally optimal solution
  - L. J. Hong and B. L. Nelson, "Discrete Optimization via Simulation using COMPASS," *Operations Research* **54**, 115-129.
  - J. Xu, L. J. Hong and B. L. Nelson, "Industrial Strength COMPASS: A Comprehensive Algorithm and Software for Optimization via Simulation," *ACM TOMACS* **20** (2010), 1-29
  - J. Xu, B. L. Nelson and L. J. Hong, "An Adapative Hyperbox Algorithm for High-Dimensional Optimization via Simulation," under review.