Tutorial 3
Regression Techniques for
Performance Parameter Estimation

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Categories and Subject Descriptors

D.2.8 [**Software Engineering**]: Metrics; C.4 [**Computer-Communication Networks**]: Performance of Systems

General Terms

Design, Performance, Verification

1. TUTORIAL OVERVIEW

This tutorial describes how to use nonlinear regression techniques to fit the parameters of any kind of performance model to performance data measured at the boundaries of the system. The advantage of this approach, which has never been a standard practice in performance work, is that it avoids the need for intrusive monitoring of execution paths, such as profiling.

The topics covered will include:

1. The estimation problem

2. Regression basics: normal equations, confidence intervals

3. Non-linear regression using iteration

4. Fitting a performance model into non-linear regression

5. Significance of model details (pruning insignificant details)

6. Examples

2. PRESENTER

Murray Woodside does research into performance modeling of software, often based on the use of the layered queuing model which he originated. He and his students have elaborated this model to describe enterprise service systems, embedded distributed systems, systems with speculative operations, and parallel computing, often with industrial partners.

He is a past Chairman of ACM Sigmetrics, a Fellow of IEEE, and an Associate Editor of Performance Evaluation, and since his retirement has had a position as Distinguished Research Professor at Carleton.

3. REFERENCES

[1] Murray Woodside, The Relationship of Performance Models to Data. In *SIPEW '08: Proceedings of the SPEC International Workshop on Performance Evaluation*, LNCS 5119, Springer, 2008.