

Project 6: Network Reliability Models (Ross)

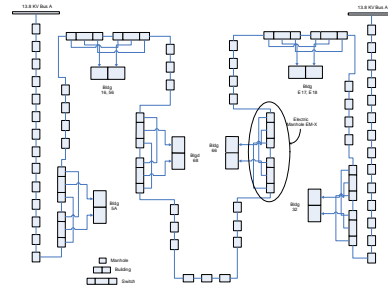
This research will develop and analyze new network reliability models that allow for component dependencies.

Modeling Area: Risk Analysis

Principal Investigator: Sheldon Ross

Institution: University of Southern California

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Electrical Network Diagram

Brief Description:

Very few network reliability models allow the component reliabilities to be dependent, greatly limiting their applications. One exception has been cascading failure models, in which the failure of a component adds additional loads to as-yet-unfailed components, possibly causing their failure. Recent work has derived the probability distribution of the number of failed components that result from such a model. However, such information does not enable one to computationally determine the probability that the resulting network system will remain operable. We propose to deal with this problem as well as more general dependent models.

Objectives:

This research seeks to develop effective simulation procedures to efficiently determine the probability that a network system of possibly dependent components will function.

Major Products and Customers:

The network reliability model can be used in all risk analysis projects involving networks, e.g., electrical and other infrastructure networks.

Interfaces to other CREATE Projects:

Collaboration with risk analysis teams and projects.

Interfaces to non-CREATE Projects:

No current direct collaborations with non-CREATE projects are expected.

Technical Approach:

The technical approach consist primarily of basic research and mathematical modeling.

Major Milestones and Dates:

1. Completion of the modeling approach -- Spring 2006.
2. Publication -- Summer 2006.