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Extension of Graph Theory to Improve Reliability and Vulnerability Modeling

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Technology Summary

In current, graph based reliability models, modeling the effects of stimulus to the system is efficient, but representing component failure beyond simultaneous double-point failure has been computationally difficult. Each suite of failures must be separately modeled as a subgraph of the original model. Even for a modest-size model, the list of possible failure combinations is impossibly vast. By augmenting the fundamental axioms of graph theory, this invention enables efficient forms of reliability modeling previously absent or computationally prohibitive in reliability models. The technique has application in communications, transportation, electric grid, water distribution, and myriad other fields.

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