OBJECTIVE – Develop methods and framework for an analytic workbench to analyze system interdependencies in context of SoS architecture and evolution to guide both systems and SoS development.

Functional/Developmental Dependency Network Analysis (FDNA/DDNA)

Methods to analyze and quantify interdependencies and cascading effects of risks through networks of systems.

System Importance Measures

Family of measures that rank systems based on their impact on the overall SoS performance. SIMs help determine which areas of the SoS have excess or inadequate resilience.

Bayesian Networks for Interdependency Analysis

• Further refinement and consolidation of computational methods towards open workbench environment to support dependency analysis and SoS evolution

Overview

Computational Methods

Computational Methods

Decision Tools: Robust Portfolio Optimization

Decision support approach from financial engineering/operations research to identify ‘portfolios’ of systems by leveraging performance against risk under uncertainties.

Performance Efficiency Frontiers for Tradespace Analysis

Decision-Tools: Dynamic Planning of SoS Architecture Evolution

Approximate dynamic programming (ADP) framework is used to make an near-optimal sequence of decisions for SoS capability development.

System Importance Measures

Future: Towards an Analytic Workbench

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