Literature Review

A Survey on Weapon Target Allocation Models [Ghanbari et al., 2021]

- Two key components of command and control are: weapon target allocation (WTA) and threat evaluation.
- Resource allocation is stochastic/uncertain with regard to the WTA problem.
- The WTA component of the WTA problem can be considered in 3 parts: response planning, response execution, outcome assessment.
- There exists three basic models:

Basic Model 1 For maximizing damage to enemy (minimize expected target values F), we have

$$\min(\ F\ )\ =\ \sum_{i=1}^{|T|} V_i\ \Pi_{k=1}^{|W|}(1-P_{ik})^{x_i k}$$

This is the general WTA formula.

Basic Model 2 For allocation of available units to maximize expected total protection value J, we have

$$\max(\ J\ ) = \sum_{j-1}^{|A|} \omega_j\ \Pi_{i\in G_j}(1-\pi_{ij}\Pi_{k=1}^{|W|}(1-P_{ik})^{x_i k}$$

Basic Model 3

Optimization of decision support system based on three-stage threat evaluation and resource management [Naseem et al.

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An approximate dynamic programming approach for comparing firing policies in a networked air defense environment [Summers et al., 2020]

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Threat Evaluation In Air Defense Systems Using Analytic Network Process [Unver and Gürbüz, 2019]

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The SSA-BP-based potential threat prediction for aerial target considering commander emotion [Wang et al., 2022]

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