

1145-90-2586

Ahmad Ridley* (adridle@tycho.ncsc.mil). *Mathematics in the Realm of Cyber Research.*

Our research goal is to demonstrate that an autonomous cyber defense (ACD) system can make an enterprise network, and its associated missions and services, more resilient to cyber-attack. An ACD system should leverage automation, artificial intelligence, and/or machine learning to autonomously reason and respond to cyber-attacks. There are several different mathematical concepts embedded in such an ACD with this cyber-reasoning and response capability. For example, game theory models can decide optimal cyber defender strategies, reinforcement learning algorithms can be used to automate and optimize cyber response actions, and statistical models can be used to determine the most important cyber features for efficient network monitoring. We will explore the applications of these types of mathematical techniques for cyber defense research. (Received September 25, 2018)