Irregular Warfare Model

Inspired by Lanchester's model

Apr 10, 2022

OVERVIEW

With the help of this model we try to analyze a variety of military conflicts between 2 or 3 armies and obtain insights about related phenomena. For this we will be using Lanchester theory as a basis while incorporating required changes and introducing various other parameters according to our needs. We try to model the mutual attritional dynamics of two opposing military forces and provide some insights regarding the fate of such engagements. In this project we'll be using deterministic equations.

We are working on a system of differential equations that show mutual attrition that happens constantly in time between two opposing forces engaged in violent engagement and use state variables to reflect the number of live combatants (or weapons) on the battlefield at any one time. These equations can be used to plan combat courses of action.

AIM

With this model, we aim to use Lanchester theory as an inspiration to model warfare and predict the outcome between various armies with symmetric or asymmetric engagement and extend the model ourselves to incorporate diverse situations such as reinforcements, technological advancements, distribution of forces as per the war situation, etc.

Recent war scenarios have been highly asymmetric, relying more on data and information, can be influenced by civilian conduct, and may involve more than two opponents. We aim to evaluate recent progress in modeling of current warfare scenarios and hope to describe some important impacts and fate of various situations and implement the same into the model. We will discuss some key insights into the outcomes of various events obtained through the use of such models.

Work Distribution

Formulation Of Mathematical Model

Yashaswi Piplani and Aditya Halli

Stability Analysis

Dhriti Nerurkar and Divyanshi Chouksey

Graph plotting and analysis in MATLAB/Python

Mragansh Goel and Arnav Gupta

Research work, Collection of Data and preparing final model

Everyone in the group

[This work distribution, although made keeping in mind everyone's consent and fair distribution, is still tentative and we all wish to help each other in every part.]

Paper referred : https://www.mdpi.com/2227-7390/8/5/737/htm