

## Linguistic geometry: From ancient warfare to modern adversarial reasoning

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## Abstract

The difficulties of modeling defense systems are related to adversarial reasoning. The main problem is to generate in real time intelligent predictive courses of action for all sides in a conflict. This problem is considered intractable by conventional approaches that suffer from the curse of dimensionality. Linguistic Geometry (LG) is a type of game theory scalable to modeling real world defense systems. LG allows us to overcome combinatorial explosion by changing the paradigm from search to construction (from analysis to synthesis). Modern applications of LG, related to the US national defense, generate, in real time, courses of action that are highly creative and even exceed the level of those developed by human commanders. Currently, the US Department of Defense is adopting the LG software to naval operations planning systems to command and control of infantry assault vehicles to missile defense testing etc. In author's talk, he will introduce participants to several advanced applications of LG and to several US Army and DARPA experiments utilized those applications. Part of the talk will be related to the origin of LG, which is a mathematical generalization of the no-search approach of a human expert to playing chess. He will also establish link between LG and legendary battles of Alexander the Great and Hannibal. Among other issues, he will introduce the hypothesis that LG is one of the ancient algorithms based directly on the Primary Language of the human brain (as suggested by J von eumann).

## Biography

Boris Stilman is currently Professor Emeritus of Computer Science at the University of Colorado Denver, USA and he is the Chairman and CEO at STILMAN Advanced Strategies, USA. He received MS in Mathematics from Moscow State University, Russia in 1972, and two PhDs in Electrical Engineering and Computer Science from National Research Institute for Electrical Engineering, Russia, in 1984. In 1972-1988, based on his 17 year experience in the research project PIONEER led by a former World Chess Champion Professor Mikhail Botvinnik, he developed Linguistic Geometry (LG), a new theory for solving abstract board games. In 1991- 2018, he continued development of the theory and applications of LG at the University of Colorado. A leap in the development LG was made in 1999, when he (with a group of scientists and engineers) founded STILMAN Advanced Strategies LLC.



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