"Submitted to JMS and ISMS conference 2015"

MODELLING STRATEGY EFFECTIVENESS WITH RESOURCE PROFIT RATIO INTEGRALS

Authors:

Juhani Hämäläinen (corresponding author)

Finnish Defence Research Agency, Riihimäki, Finland

Email: juhani.hamalainen@mil.fi

Juha-Pekka Nikkarila

Finnish Defence Research Agency, Riihimäki, Finland

Email: juha-pekka.nikkarila@mil.fi

Juhani Hämäläinen received his PhD degree in theoretical physics from the University of Jyväskylä in 2004. He is currently in the position of principal scientist at Finnish Defence Research Agency. His research interests include mathematical model development and analysis applied to military problems.

Juha-Pekka Nikkarila obtained his PhD degree in physics from the University of Jyväskylä in 2008. He is currently working as a scientist at Finnish Defence Research Agency. His research interests include electronic warfare, mathematical model development and analysis applied to military problems.

Modelling strategy effectiveness with resource profit ratio integrals

Abstract

Strategy is an organizational tool to plan resources, investments and future goals for determining wanted forthcoming state of a company or organization. Strategy often includes future visions and goals in a developing operational environment. We shall now consider a question of comparing strategies via investments and profits in a commensurate way. We begin by describing a process of strategy formation in a modular way and focus our study to mathematical modeling of strategy effectiveness. It could be a valuable advantage for comparing alternative strategies or more likely to find the most efficient strategy with available resources. We shall propose a method for an analytic comparison of strategies over given time period. As our best knowledge, continuous analysis over time scale would offer a new insight to study effectiveness of a strategy. We shall generalize net present value (NPV) of continuous systems, well known in economics, to cover resources and outcomes generally. The approach is applicable in comparing competitive strategies, e.g. two side conflicts or alternative strategies of given organization. The Game Theory is intrinsically present since the own resource usage affects to the opponent's choices in considering competitive actors. New insight is to consider mathematically strategy effectiveness for strategy comparison.

Keywords: strategy estimates, resource allocation, quantitative modelling