

## Pursuit and Evasion Modeling

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### ABSTRACT:

The basic ideas behind pursuit and evasion modeling lie within everyday occurrences either in a simple game of tag among grade school kids on the playground or in environments that are more complex, where soldiers in military forces may be in danger of being captured or killed. The purpose of studying topics in pursuit and evasion is to gain a better understanding of the communication and interaction necessary for cooperation among entities in a certain offensive or defensive group. If we can better understand the information necessary to achieve cooperation among independent robots then we can develop the tools needed to increase the technology that could provide better security and protection to troops abroad. Additionally, topics in pursuit and evasion modeling can help develop different avoidance and capture strategies in combat scenarios. For example, a strategy of avoidance worth exploring is the idea behind a “sacrificial lamb”, or some evading entity willing to sacrifice itself for the good of the group. Furthermore, a pursuing technique needing further investigation is the optimal lead equation, meaning that some theorems need to be developed to identify when a pursuing entity should lead an evading entity and by how much. The amount of information we can gain through better understanding the mathematics behind the very basic idea of a game of tag out on the playground is without bound. As the complexities of models grow, the more we can gain and understand the interaction at play and the necessity behind the kind communication between entities.

KEYWORDS: pursuit, evasion, sacrificial lamb, lead equation, communication

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