**An optimization approach to the multi-player pursuit-evasion problem**

Author: Yue Jiao, Ivan Skvortsov

Responsible: Xiaoming Hu

Supervisor: Silun Zhang

Institution: Mathematic Institution

Abstract:

In this article the methodology of multiple pursuer chasing one or more evader is studied. The approach is done both on an open area without obstacles and closed area with obstacles. In open area a fairly accurate dynamics of both pursuers and evaders are implemented. Virtual Vehicle Approach is used in this section. The main purpose of this section is to find a decentralized robust control method for the dynamics of the pursuers. In the close area, the line of sight and field of view are introduced and the solution to Minimum time UGV surveillance problem and the Centroidal Voronoi partitions are used. A graph theory approach and a trivial method are implemented and compared. The dynamics are simplified in the closed area to simplify the implementation. Different capturing strategies, encirclement and one-on-one chase, are both studied and compared. The numerical implementation and the resulting simulation are presented and analyzed. Conclusion on the optimal formation for multiple pursuers in this pursuit-evasion problem is made.