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Cooperative Search Strategies for Multi-Vehicle Teams

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Abstract:
In this thesis, the problem of finding optimal searcher paths for multiple searchers is studied. First, a wireless multi-robot test bed consisting of four mobile platforms, a wireless radio link for communication and a central station are introduced. Then, a hierarchical control architecture for multi-vehicle teams and a communication protocol is developed. In the second part of the thesis, this cooperation framework is used to devise search strategies for multiple searchers. We implemented an algorithm to find a searcher path so as to approximate the optimal effort allocation. Next, the coordination and coordinated set concepts are defined and the algorithm is extended to multiple searchers. It is observed that the hierarchical control architecture provides a useful framework to design cooperative laws. Furthermore, we demonstrated that the our cooperative search strategy achieves a close approximation to the optimal allocation.