

**ADAPTIVE RECEDING HORIZON STRATEGIES  
FOR REAL-TIME TARGET TRACKING**

by

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## ABSTRACT

This paper is concerned with the design of an efficient adaptive algorithm for a fighter aircraft in an air-to-air interception task against an arbitrarily manoeuvring opponent. This is a time optimal pursuit problem in which a fairly simple dynamic model is used to describe a planar engagement between constant speed aircraft, both with instantaneous control responses.

The turning rate controls for both aircraft are constrained by appropriate limits, and it is assumed that the ratio of the pursuer's best turning radius to the initial range is small.

Previously receding horizon control has been used to obtain stabilizing feedback laws for time-varying systems. Here, fixed horizon and receding horizon controllers are considered, within an adaptive control framework, in order to tackle the problem more efficiently.

The adaptive predictive algorithms presented are fairly easy to implement for real-time operation, and prove to be fairly robust to random manoeuvres by the opponent. Algorithms are presented and implementation studies highlighted.

## References

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