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拦截机动目标的模糊导引律研究

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FUZZY GUIDANCE LAW FOR INTERCEPTING MANEUVERING TARGET

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摘要

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摘要

使用模糊方法研究了三维实际追逃问题的最小能量导引律问题。首先, 通过对一些状态变量的定义域进行在线模糊分区, 一方面, 将非线性模型变为模糊T-S线性模型; 另一方面, 又能方便地处理目标的任意机动而引起的目标运动方向的变化。其次, 利用RH (Receding Horizon) 控制方法和伴随技术, 在目标作对抗性机动条件下, 获得了一个有效拦截的导引律。数值仿真结果表明, 由这种导引律导引的导弹能够精确拦截任意机动的目标。

关键词: 三维追逃问题 最小能量导引 模糊分区

Abstract:

A realistic three dimensional pursuit evasion game between a missile and an aircraft is considered by the fuzzy method, which not only reduces the nonlinear model into a linear one, but also deals with the changes of the evader's motion. Next, the study is conducted by employing the receding horizon control strategy and adjoint technique. An efficient and robust guidance law is derived, while the evader uses maneuvering strategy to avoid capture. Numerical simulation demonstrates that the missile guided by this law can intercept the randomly maneuvering evader precisely.

Keywords: pursuit- evasion problem in 3-dimensions minimum energy guidance fuzzy partitioning

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