عنوان مقاله:

Designing the Nonlinear Guidance Law Adaptable to Initial Deviations for the Vertical Landing of the Booster

محل انتشار:

تعداد صفحات اصل مقاله: 12

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خلاصه مقاله:

This study proposes a new non-linear guidance law for a Falcon ۹ missile booster landing's terminal phase using a non-linear vectorized high expansion method. For this purpose, At first, the dynamic modeling of the landing problem is presented, assuming mass, gravity, and density are variables. Then, sensitivity variables are extracted using the vectorized high order expansion method and assuming the parameters constant. Then, the guidance law is extracted to update the path and optimal commands using sensitivity variables. The path and commands of the near-optimal guidance are extracted online using the proposed guidance law. Considering initial deviations, the guidance law performance in simulations are studied using a combination of various initial deviations. The results shown as charts and numerical values of errors indicate that the landing point errors are insignificant, and the vectorized high order expansion method has a desirable performance for the reusable booster's vertical landing.

کلمات کلیدی:

Vectorized high order expansion, non-linear optimal control, Booster Landing, Optimal guidance

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