



航空学报 » 1991, Vol. 12 » Issue (1) :54-62 DOI:

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柔性航天器大角度操纵的直接输出反馈控制

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DIRECT OUTPUT FEEDBACK CONTROL OF FLEXIBLE SPACECRAFTS DURING A LARGE-ANGLE MANEUVER

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摘要 本文研究了柔性航天器大角度操纵的控制问题,提出了直接输出反馈控制方法。证明了通过输出的线性反馈,用少量的控制器可以达到柔性航天器的渐近稳定调节。同时给出了所需控制器数目及其设置条件,并给出了直接输出反馈控制所对应的最优指标,从而实现了利用少量控制器控制高维非线性系统。

关键词: 柔性航天器 非线性 李雅普诺夫方法 控制器数目

Abstract: The control problem of a flexible spacecraft during a large-angle maneuver is studied and a direct output feedback control method is proposed. It is shown that a linear output feedback is effective for asymptotic stability of the flexible spacecraft with a few control devices. The number of the required control devices and their location have been given. Optimal index of the direct output feedback control is also given. In this way, it is achieved that the large-dimension nonlinear system is controlled by using a few control devices.

Keywords: flexible spacecraft nonlinear Liapunov Method number of control device.

Received 1988-08-20; published 1991-01-25

引用本文:

曾文陵;高为炳;程勉. 柔性航天器大角度操纵的直接输出反馈控制[J]. 航空学报, 1991, 12(1): 54-62.

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