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拴连卫星系统在轨道保持中的镇定的一种新方法

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A NEW APPROACH TO STABILIZATION OF TETHERED SATELLITES DURING STATION KEEPING

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摘要

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摘要 给出了求拴连卫星系统在轨道保持中的局部镇定律的一种新方法。当拴连卫星系统的拴连约束假设为刚性且无质量时,在构造镇定律时,必须应用有关临界镇定的一些结果。方法是中心流形理论和Lyapunov方法的一种组合,和Liaw & Abed的方法相比,它避免Hopf分叉理论的应用和Floquet指数的计算,易为工程上应用。

关键词: 拴连卫星系统 临界镇定 Lyapunov方法 中心流形理论

Abstract: A new approach to stabilization of tethered satellites during station keeping is presented. It is observed that results from the critical stabilization must be applied in the construction of the stabilizing law for a tethered satellite system when the tether is assumed rigid and massless. Our method is the combination of the centre manifold theory and Lyapunov method. When compared with Liaw and Abed's method, in which tools related to the Hopf bifurcation are employed, it avoids calculating the Floquet exponents and is easily mastered by control engineers.

Keywords: tethered satellite system critical stabilization Lyapunov method centre manifold theory

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