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一类非线性系统的变结构控制问题

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VARIABLE STRUCTURE CONTROL FOR A CLASS OF NONLINEAR CONTROL SYSTEMS

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摘要

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摘要 本文研究了简约型非线性控制系统的变结构控制问题,针对变结构控制切换函数的确定问题进行了深入研究,给出了一类非线性系统切换函数的确定方法。研究表明,该方法适用于一类难于或不能可控正则化和线性化的非线性控制系统的综合。最后通过仿真证实了该方法的有效性。

关键词: 非线性系统 变结构控制 切换函数

Abstract: A variable structure control of concise nonlinear systems is discussed in this paper. On the basis of sliding mode theory and the concept of approaching law, the concrete form of control law of concise nonlinear variable structure control systems is given. By the idea of designing linearization by state variable feedback, the selection of switching function of the variable structure control is deeply studied, and the concrete selection method of variable structure switching function of a class of nonlinear systems is also studied. Finally, the effectiveness of the method is proved by the digital simulation. The study results show that the method presented in the paper is suitable for the synthesis of both a class of nonlinear control systems, which is difficult or impossible to give controllability canonical form and linear form, and one of the nonlinear systems which can give controllability canonical form. Otherwise, the method is simple and direct-viewing for designing process, and convenient for engineering application. It is valuable to point out that the synthesis of a broader class of nonlinear control systems can be discussed by using the idea of design in the paper.

Keywords: nonlinear system variable structure control switching function

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