

论文

一种积分过程PID自整定方法

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摘要:

针对积分加滞后过程,提出了一种设定值加权的PID控制器参数自整定方法,并且针对该方法定义了一种鲁棒性能指标.首先引入一种内部反馈结构,利用内部反馈结构中的比例控制器将积分过程转换为广义稳定过程,这就使得普通PID控制器设计方法可以在积分过程中得以应用.利用该方法并基于该鲁棒指标设计的控制器一方面克服了传统PID控制方法在控制积分过程时存在的结构上的缺陷,同时又提高了系统的鲁棒性和控制性能,仿真结果也表明基于本方法整定的控制器的控制效果要优于其它方法.

关键词: PID控制器 自整定 积分过程 鲁棒性

A PID tuning method for integrating processes

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Abstract:

Abstract: A PID auto-tuning method based robust specification for integrating processes with time delay was proposed using two feedback loop design technique. A robust specification was proposed in this paper. An internal feedback loop was added and the integrating process was converted into a generalized stable process for the proportional controller in the feedback loop. So the common PID auto tuning method can be used to tune the integrating process. With the proposed PID tuning method and the defined robust specification, the controller can overcome the structural limitation of a typical PID controller for integrating processes, and guarantee both robustness and performance. Simulation examples were given to show the superior performance of the proposed tuning method against other methods.

Keywords: PID controller auto-tuning integrating processes robustness

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