

科学基金

基于主动耦合干预的无级变速器速比控制

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摘要:

利用夹紧力与速比之间的耦合作用,在保证传动可靠的前提下,通过联合调节主从动轮油缸压力来干预速比控制,暂时提高系统压力以扩大速比变化率的可控范围。从速比跟踪性能、经济性、动力性、恶劣工况适应性、与夹紧力相关的传动可靠性、与速比变化率相关的舒适性等方面,研究了主动耦合干预控制方法的控制性能。对踏板开度突变工况、超车加速工况、冰雪路面打滑工况和循环工况等工况进行仿真,结果表明:主动耦合干预控制法在保证可靠性、经济性和舒适性的前提下,改善了速比跟踪性能,提高了动力性,增强了在驱动轮打滑等恶劣工况下的适应性,其中目标速比阶跃工况下的速比跟踪误差减小11%~53%,从30km/h加速到60km/h的超车加速时间缩短约0.7s。

关键词:

车辆工程 无级变速传动 传动比 夹紧力 耦合

Speed Ratio Control of Continuously Variable Transmission Based on Active Coupling Control Strategy

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Abstract:

Utilizing the coupling effect between clamping force and speed ratio, the shift speed is improved by conditioning the pressure of both primary and second pulleys' hydraulic cylinders. System pressure safety must be ensured to satisfy the clamping force which could meet the requirements of torque transmission. As a result, real ratio tracked the target more rapidly and shift speed range was enlarged. An active coupling control strategy was studied, which included shift speed, clamping force related transmission reliability, fuel economic, dynamic performance, hard condition adaptability, and shift speed related comfortableness. Simulation results show that by adopting active coupling control strategy, reliability, economic, and comfortableness are ensured while ratio tracking performance and power performance are improved. Particularly, ratio tracking error is reduced by 11%~53%, 30~60km/h overtaking acceleration time is shortened by 0.7s.

Keywords: [automotive engineeringzz'\)](#)" href="#"> **automotive engineering** continuously variable transmission speed ratio clamping force coupling

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