

University of Macau

Abstract

**Development of a Novel Electro-Hydraulic Fully Variable Valve-Train for  
Four-Stroke Automotive Engines**

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In modern four-stroke engine technology, variable valve timing (VVT) and lift control offers potential benefits for making a high-performance engine. In this thesis, a novel electro-hydraulic fully variable valve train for four-stroke engines is introduced. The construction of the nonlinear mathematic model of the valve train system and its dynamic analysis are also presented. Experimental and simulation results show that the novel electro-hydraulic valve train can achieve fully variable valve timing and lift control. Consequently the engine performance on different loads and speeds will be significantly increased. This technology also permits the elimination of the traditional intake throttle in gasoline engines and increases the engine design flexibility.