

Structural Optimization of Flywheel Design via Genetic Algorithm

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ABSTRACT

Nowaday because of decreasing of the available energy source, the role of flywheel in stored energy technology becomes an emergent engineering subject. Flywheel is changed its speed up or down for energy absorbs or store in order to smooth out variations in the speed of a shaft caused by torque fluctuations. Owing to its simple structure and easy maintenance, also to its low efficient loss and low pollution relative to other stored energy equipment, flywheel is usually called for in machines with fluctuating load during operation in industry. The genetic algorithm appeared first in 1967, then achieved the intensive research by experts, also was efficiently applied to solve single- and multi-object optimal problems. In this research the multi-objective optimal problems for the driven shaft and the flywheel structure are explored by using the fast elitist non-dominated sorting genetic algorithm (NSGA-II) proposed by Deb. Each optimal design case is pursued according to its design target which includes the geometry for flywheel, and the needed numbers of spoke. Finally, the results of stress estimated in each case are compared with that of the COSMOS analysis.

Keywords : Genetic algorithms ; Flywheel design ; Driven shaft ; NSGA

Table of Contents

授權書.....	iii	中文摘要.....	iv	英文摘要.....	v
誌謝.....	v	目錄.....	vi	目錄.....	vii
圖目錄.....	vii	附錄.....	xiv	符號單位索引.....	xv
第一章 緒論.....	xvi	1.1 前言.....	1	1.2 研究動機與目的.....	2
1.3 本文目標.....	3	第二章 文獻回顧.....	4	2.1 飛輪的設計、原理及分析.....	4
2.1.1 飛輪發展歷史.....	4	2.1.2 飛輪儲能系統的優點.....	4	2.1.3 飛輪儲能工作原理.....	6
2.1.4 飛輪結構設計.....	8	2.1.5 國內外飛輪儲能技術的發展概況.....	10	2.1.6 飛輪儲能技術的應用面.....	12
2.2 最佳化法則.....	12	2.2.1 最佳化觀念.....	13	2.3 基因演算法發展史.....	14
2.3.1 基因演算法的改良.....	15	2.3.2 小生境(Niche)技術發展史.....	16	第三章 基因演算法.....	22
3.1 基因演算法的起源.....	22	3.2 基因演算法的原理.....	23	3.3 基因演算法的具體例子與基因演算法的步驟.....	26
3.3.1 基因演算法：編碼.....	26	3.3.2 基因演算法：選擇 (selection)	28	3.3.3 基因演算法：交配 (crossover) 或稱重組.....	31
3.3.4 基因演算法：突變.....	35	3.4 多目標最佳化的概念.....	38	3.5 多目標最佳化常用的求解方法.....	39
3.6 過早收斂問題及其防止.....	42	3.6.1 過早收斂問題.....	42	3.6.2 防止過早收斂.....	43
3.7 常見的約束處理方法.....	45	3.7.1 搜尋空間限定法.....	45	3.7.2 可行解變換法.....	45
3.7.3 懲罰函數法.....	46	3.8 小生境技術 (Niched Genetic Algorithm)	47	3.9 非支配排序基因演算法NSGA.....	48
3.10 精英策略的非支配排序基因演算法NSGA-II.....	49	3.10.1 NSGA 使用機制.....	50	第四章 飛輪設計.....	55
4.1 飛輪的定義.....	55	4.2 飛輪歷史.....	55	4.3 飛輪儲能原理.....	56
4.4 速率波動係數與能量.....	57	4.5 飛輪形式與幾何名稱.....	60	4.6 飛輪輪輻與質量慣性矩.....	61
4.6.1 輪輻設計.....	61	4.6.2 質量慣性矩.....	63	4.7 飛輪應力及強度分析.....	64
4.7.1 實心圓盤飛輪應力分析.....	69	4.7.2 空心圓盤飛輪應力分析.....	70	4.7.3 具輪輻飛輪之應力分析.....	72
4.8 軸設計.....	74	4.8.1 等斷面軸設計.....	74	4.8.2 軸之材料.....	75

料.....	76 4.9 COSMOS應力分析.....	76 4.9.1 有限元素分
析.....	77 4.9.2 分析步驟.....	77 4.9.3 建立數學模
型.....	79 第五章 飛輪最佳化.....	80 5.1 研究方
法.....	80 5.2 設計適合50噸動力沖床.....	81 5.2.1 飛輪速度減少
率.....	81 5.2.2 飛輪所需要運動能.....	82 5.2.3 50噸動力沖床之飛輪所需運動
能計算.....	83 5.3 軸設計最佳化試作.....	84 5.3.1 軸的靜態強
度.....	84 5.4 圓盤飛輪設計最佳化.....	88 5.4.1 圓盤飛輪設計---轉速固
定.....	89 5.4.2 圓盤飛輪設計---可調轉速.....	93 5.4.3 圓盤飛輪設計---所需動能無窮
大.....	95 5.5 輪輻飛輪設計最佳化.....	97 5.5.1 用COSMOS分析飛輪應
力.....	107 5.6 輪輻數目與應力關係.....	111 5.6.1 研究方
法.....	111 5.6.2 研究說明.....	112 5.6.3 研究結
果.....	114 第六章 結論.....	119 6.1 研究結
語.....	119 6.2 研究建議.....	120 6.3 未來展
望.....	121 參考文獻.....	123 附
錄.....	128	

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