

88 年度國家標準實驗室計畫執行成果摘要表

研究報告

計畫名稱	中文	建立及維持我國時間與頻率國家標準		
計畫編號	英文	The Maintenance and New Technology Establishment of National standard for Time and frequency		
計畫編號	TL-001-P201(88)			
執行單位	中華電信研究所		執行期間	87 年 7 月至 88 年 6 月
主持人	廖 嘉 旭		協同主持人	
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成 果 名 稱	中文	灰預測在能力試驗系統之應用可行性評估報告		
	英文	Feasibility study of the application of gray prediction to oscillator proficiency/testing systems		
撰 寫 人	張清濠		廖嘉旭	
撰寫日期	中 華 民 國 88 年 1 月 日		撰寫語言及頁數	英文 7 頁
解密期限	中 華 民 國 年 月 底 解 密		機密級	
關 鍵 詞	Gray dynamic model; Prediction error; GM(1,1)			
<p>內容摘要： A method of steering atomic clocks with prediction based on the theory of gray dynamic model is discussed in this report. The gray dynamic model, denoted GM(n, h) in the original article with n being the order of the system and h being the number of variables in the system, has been proven successful in predicting system behaviors conforming to some form. In this work, we use GM(1,1) to predict phase errors between two clocks and then use the result to steer the clock. Advantage of using the model is that it is capable of predicting future data based on a small set of data samples. Two examples are conducted in this report. First, a set of data recorded in our laboratory is used to see its capability in predicting the phase error between two clocks. Experiment result shows that the maximum error resulted is about 50 % lower than that resulted from the use of least squares fit. Second, a set of noisy data is used to estimate the frequency offset of a clock based on the GM(1,1) and, then, to steer the clock based on that estimate. Experiment result shows that a clock with frequency offset in the order of E-13 can be improved to the order of E-14 after steering with the estimate.</p>				