

The study of Optimal-Feedrate controller for a computerized numerical controlled machine

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摘要

本研究目標為電腦數值控制(CNC)機器提供一個最佳進給率控制器。第一是以最佳進給率提供一個速度控制插值。在插值過程中，採取用即時插值方法，曲線的弦高誤差和曲線的切線向量方向一再檢查。為了限制弦高誤差不超過原來的設定值，如果弦高誤差超過原設定值或發現轉角太小，提供的插值方法會自動調整進給率。然後本研究利用一個非均勻有理B形雲形線(NURBS)來檢查本研究提供的插值方法的可行性和正確性。第二是利用富士機電的開放式可程式邏輯控制器(PLC)，以其控制器的Structured Text程式語言開發出向前看線性急跳度濾波器(LALJF)。為了保證在即時加工過程中，工具路徑得到線性急跳度變化後，能夠平坦而精確，本研究提供的濾波器由向前看演算法和三修正移平均濾波器(3MMAF)組成。向前看演算法執行向前看一步改變的速度。這LALJF以步進改變的速度，最大的加減速度，和最大的急跳度算出速度命令，然後送給CNC的速度控制器。最後本研究提供的濾波器裝置於一個三軸CNC機器，進行實驗得到實驗結果。為了證明LALJF的可行性和正確性，本研究建構一個多步變速度的曲線和一個高速度測量系統的速度曲線來進行驗證。經由實驗結果，本控制器可得到即時的實際速度曲線，與較短的運動時間。

關鍵詞：參數曲線、速度控制、看向前線性急跳度濾波器

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