壓電市列印頭噴墨過程之數值研究

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摘 要

本文主要利用數值方法討論一個全尺寸壓電噴墨頭的微射出 過程，在分析理論部分建立一三維暫態之守恆方程式，採用連續 表面張力模式以模擬表面張力效應對界面運動的影響。結合以上 方程式，應用SIMPLEC 數值方法求出流場特性，並利用分段連 續界面建立界面重建之數值方法描述液體表面運動的行為。研究 結果再與實驗量測比對。在一個完全噴出週期計算氣液界面與時 間的關係。各階段的流體運動的現象，包括補墨，噴出，和墨滴 的形成，在這三個過程詳細探討。 本文亦就噴嘴尺寸、操作電壓波型、墨水的性質對墨滴串形 狀發展的影響，及對墨滴串從噴嘴口剝離的時刻、主液滴及衛星液滴分離的時刻之影響，進行完整的研究。

關鍵詞 : 壓電印表頭，噴墨列印過程，液滴行為，數值模擬

目錄

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