類神經網路應用於雙相氣泡流相傳遞特性之即時決定

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摘 要

高壓雙相氣泡紊流中，由於氣－液相界面上交互作用蘊含著質量、動量和能量轉換過程，所以傳輸現 象是極為複雜。雖然物理機制可經由廣泛地實驗量測與完整理論模擬探討而有所了解；然而，在實際的 工業應用中常需要快速地決定紊流氣泡流場動態特性為系統監控用途，故而本研究將運用類神經網路以 即時掌握高壓雙相氣泡紊流流域內相發展的機制。分析基於LIU'S所量測實驗的數據資料和理論模型數值 計算資料庫分別建立兩組三個倒傳遞類神經網路，以預測雙相紊流氣泡流相的分佈。經比較預測向量和 目標向量差異可求出其均方根誤差。完成驗證後的類神經網路能準確預測壓力範圍由1 MPA和3.5至7.0 MPA的雙相氣泡紊流空泡分率、液相速度和氣相速度等分佈。本研究也將詳細探討各種網路參數（包含 了隱藏層數目、訓練對數目、轉換函數型式、學習增加率數值、學習減少率數值和動量項數值等）對於 類神經網路訓練品質影響。

關鍵詞 : 類神經網路、倒傳遞、雙相氣泡流、相分佈

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