壓縮流場的低雷諾數紊流模式分析

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摘 要

本文主要目的在探討可壓縮流場的低雷諾數紊流模式分析。在可壓縮流場的計算上，為了能準確的預估邊界層內複雜的情況，需選用適用性更廣的低雷諾數紊流模式，而採用了Chang and Hsieh所發展出強健式低雷諾數紊流模式來進行流場的模擬。 為了能充分解析層流次層（viscous sublayer）的變化，近壁處的格點分佈需非常細密，數值計算難度極高，在數值方法的選取極為重要。本文在層流流場中選用了Yoon和Jameson所發表的隱式法（implicit）、LU-SSOR、時間前進法（time marching）、有限體積等數值方法；在紊流流場中使用有限差分法，並用隱式法及ADI數值方法，運用LU技巧求出紊流黏滯係數，如此即可將紊流效應加入原流場的統御方程式之中，使分析的流場成為一紊流流場，可得到紊流效應的數值結果。 最後，將實際數值模擬的速度、阻力係數等流場性質與理論流場的性質互相比較，其所得的結果令人滿意。

關鍵詞 : 壓縮流場 ; 紊流效應 ; 紊流模式 ; 強健式低雷諾數紊流模式 ; 計算流體力學

目錄

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