원심 압축기 벌류트 3차원 유동의 수치해석

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Numerical Study on the Three-Dimensional Volute Flow of Centrifugal Compressor

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Key Words: Centrifugal Compressor(원심압축기), Scroll Volute(스크롤 벌류트), Straight Conical Volute(원뿔형 직관 벌류트), Multi-block Grid(다중블록격자)

Abstract : Three dimensional turbulent flow in the scroll volute of centrifugal compressor has been numerically investigated in this paper by solving the Navier-Stokes equations and k -ε equation model. The computational grid for the flow field of the scroll volute has been constructed based on the multi-block grid, which is good to avoid the central grid singularity as well as to make grid stretching toward the volute wall. Numerical result has been obtained for the three-dimensional flow of scroll volute. The straight conical volute flow is also solved and compared with the scroll volute data. This comparison contributed to comprehend the effect of scroll in the three-dimensional volute flow of a centrifugal compressor.

SPR 격자점 재구성을 통한 시간 진행 문제의 수렴 가속화

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Convergence Acceleration of time-marching problem through SPR grid adaptation.

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Key Words: CFD(전산유체역학), Sparse Point Representation(희소점 표현법), Wavelets(웨이블렛)

Abstract : Sparse Point Representation based on interpolation wavelet is implemented for the purpose of convergence acceleration of time-marching numerical scheme. In solving non-linear Burgers Equation, SPR reconstruct the grid points at each time step. This grid re-adaptation through SPR allows huge reduction of computation time without losing accuracy. It is thus believed that the application of the SPR to Navier-Stokes flow solver may enjoy considerable improvement of computational time and memory efficiency.