عنوان مقاله:

Critical Cavitation Number Determination of a High-speed Centrifugal Pump by Numerical Simulation of a Two-phase Flow

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خلاصه مقاله:

This paper aims to present an investigation on determining the critical cavitation number of a high-speed centrifugal pump by computational fluid dynamics. In doing so, characteristic curves of the pump used in this study were obtained in the presence and absence of cavitation. The critical cavitation number was calculated based on the cavitation breakdown characteristic curve. Two-phase flow inside the pump was simulated using the homogenous mixture method and the Rayleigh-Plesset model. The SST turbulence model and MRF rotating model were used to simulate turbulence and rotation of the flow throgh the pump, respecively. The critical cavitation number that was the outcome of numerical analysis results was compared to the experimental data. This comparison implied the necessity of considering the safety factor for determining the critical cavitation number and inlet pressure required to uninterrupted operation of the pump cavitation, using the results of numerical analysis.

کلمات کلیدی:

Centrifugal pump, the critical cavitation number, inducer, CFD, the characteristic curve