离心泵压力脉动特性分析 Numerical Investigation of Unsteady Pressure Fluctuations in Centrifugal Pump

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关键词： 离心泵 数值模拟 压力脉动 频域分析

摘 要： 为了研究压力脉动在离心泵不同位置的变化规律及其关系，利用CFD技术对离心泵内部流场进行多工况定常与非定常三维数值模拟，得到内部流场特性及计算点的压力脉动情况，并对其进行频域分析。结果表明，设计工况和大流量工况下，叶频是主要影响频率，而在小流量工况下，轴频是主要影响频率；压力脉动幅值随偏离工况的情况而变化，同一流量下，流道的进出口压力脉动变化大。 The research was conducted for the purpose of studying the rules of pressure fluctuation under different positions in a centrifugal pump, and to find their relationships. The frequency spectra of pressure signal located at the pump was obtained with CFD. The results showed that the blade passing frequency dominated the pressure fluctuations at the design and large flow rate condition, and at the small flow rate condition the axis frequency became dominative in the pressure fluctuations. The amplitude of the pressure fluctuation was different at the varied flow rates, and the amplitude became higher at inlet and outlet of the passage.

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