

控制科学与工程

基于VOF方法的赛艇艇型优化

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摘要:

为减小赛艇行驶过程中的阻力、提高运动员的成绩,对赛艇艇型进行优化。采用RNG k-ε (renormalization group k-ε)湍流模型、VOF(volume of fluid)方法对单人赛艇的周围流场和阻力特性进行了数值计算,获得了赛艇周围的速度分布和压力分布等流场信息,实验结果证实了数值计算的可靠性。利用数值计算对赛艇艇型进行了优化,得到了赛艇阻力与艇型的关系。研究结果对于改善赛艇性能、减小赛艇阻力具有重要的参考价值 and 指导意义。

关键词: 湍流模型 体积函数法 数值计算 赛艇 自由面

The optimization of rowing bote type based on VOF method

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Abstract:

The rowing boat type was optimized to reduce the rowing resistance and to help the athletes to earn a good competition outcome. RNG k-ε turbulent model and VOF method were used to calculate the flow field and the resistance characteristics, and the velocity and pressure distribution around a single rowing boat was obtained. Experimental results showed the reliability of the numerical calculation. The rowing boat type was optimized and the relationship between resistance characteristic and rowing type was obtained. The results could give some instructions to reduce the rowing boat resistance and improve its performance.

Keywords: turbulent model VOF numerical calculation rowing free face

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