

Abstract Submitted  
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**LES of flows around a circular cylinder at the critical Reynolds numbers**<sup>1</sup> YOSHIYUKI ONO, Obayashi Corporation, TETSURO TAMURA, Tokyo Institute of Technology — The recent advancement of numerical techniques has made it possible to simulate a bluff body wake accompanied with unsteady vortices at relatively high Reynolds numbers. However, even now it is not easy to accurately simulate the flow around a circular cylinder at higher Reynolds numbers especially above the critical Reynolds number. In order to simulate very high Reynolds number flows, the adequate numerical model which has a sophisticated SGS model, sufficient grid resolution and appropriately-controlled numerical dissipation is required. On the other hand, for realizing the simulation of the critical Reynolds number flow, one strategy is the usage of oncoming turbulence. Oncoming turbulence can sensitively affect the flow characteristics around the separation point and lead to reduce the critical Reynolds number. In this research, the LES method is applied to the flow around a circular cylinder at high Reynolds number. We control the numerical dissipation introduced by higher-order upwind scheme. The applicability and the limitation of the present LES model to predict the flow around a circular cylinder at very high Reynolds numbers are investigated.

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