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Adaptive Mesh Refinement on Shape Optimization Problem for Suppressing Time Periodic Flow

Takashi NAKAZAWA, Associate Professor
Center for Mathematical Modelling and Data Science, Osaka University
Address: Graduate School of Engineering Science I205B, Osaka University
1-3, Machikaneyama-cho, Toyonaka-shi, Oaksa, Japan, 560-8531
Email: nakazawa@sigmath.es.osaka-u.ac.jp

Abstract: The shape optimization problem is playing important roles in fluid mechanics and industry, especially optimal design for high speed fluid machinery, like the airplane wing and body or the engine inside. Therefore, turbulent control has been one of big studies ever. For that, the author is focusing on flow stability control and developing some new shape optimization problems.

T. Nakazawa[1] solved a shape optimization problem, where the dissipation energy is defined the cost function. And the linear stability is compared in the initial and the optimal shape. For more direct flow stability control, T. Nakazawa and H. Azegami [2] defined the growth rate as the cost function by performing linear stability analysis. By the way, for usage of the method, the stationary Navier-Stokes problem should be solved for linear stability analysis. Therefore, T. Nakazawa [3] develop the new shape optimization method for controlling the time dependent flow, where the cost function is the eigenvalues of Snapshot POD and the constraint functions are the nonstationary Navier-Stokes problem and the eigenvalue problem of Snapshot POD.

References

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