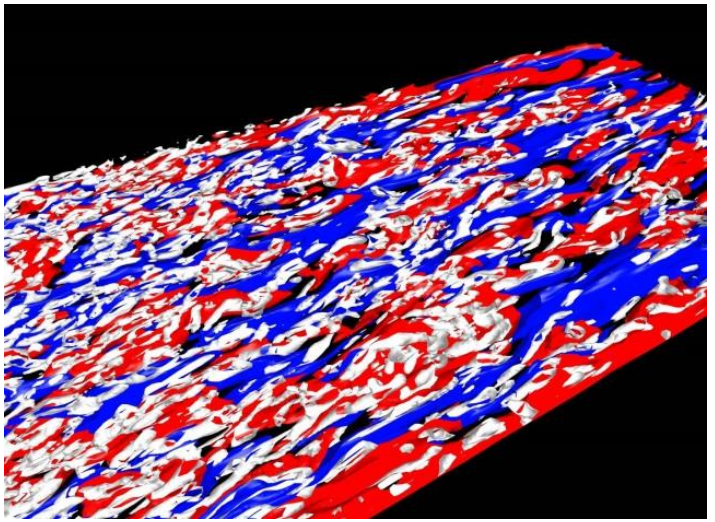
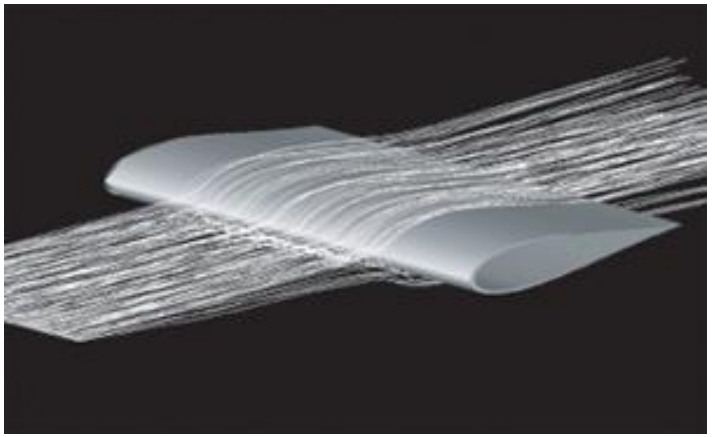
乱流境界層

乱流境界層は翼面上や自動車表面上等の輸送機器周りの流れや大気環境中の流れに見られる

乱流境界層の構造を理解し，その制御を行うことは工学的に重要！



壁面近傍のストリーク構造
（鈴木・長田・酒井他，DNS）



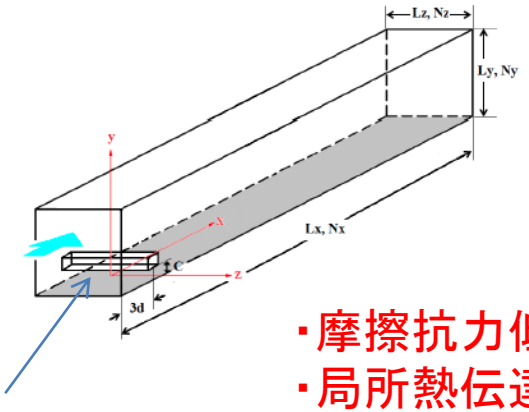
流入変動を伴う翼周り流れの数値計算
（名大 酒井研）

今後の展開

・正/逆圧力こう配の影響、はく離の制御
・翼周りの流れ（乱流/衝撃波干渉含む）

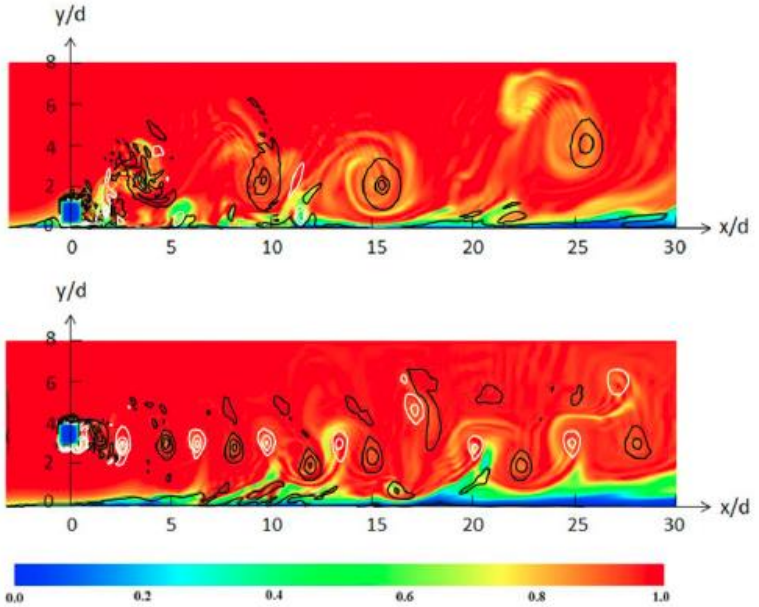
乱流境界層

空間発展境界層に及ぼす主流乱れの影響（DNS）

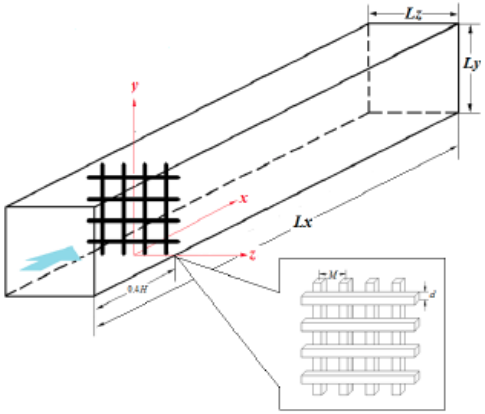


角柱

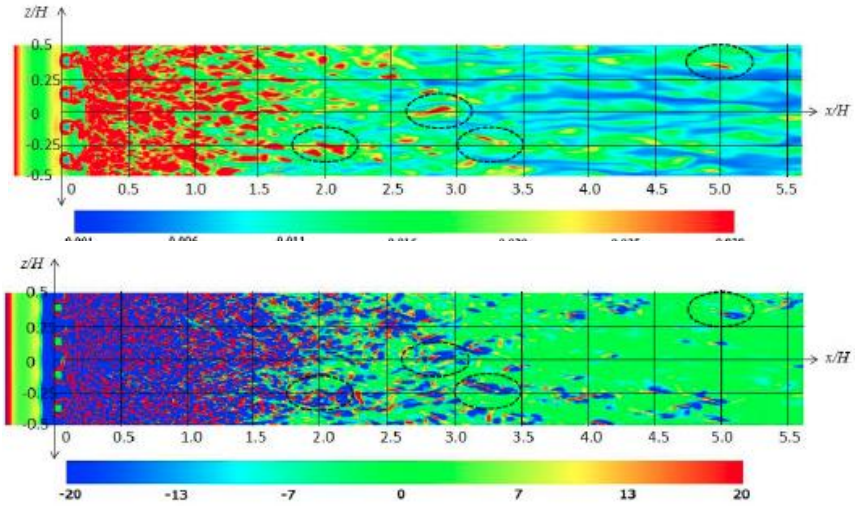
・摩擦抗力低減
・局所熱伝達率の向上



瞬間温度



乱流格子



上：局所熱伝達率と下：渦構造（Q値）の関係

関連論文

- S. Xia, Y. Ito, K. Nagata, Y. Sakai and T. Hayase , “Numerical study on a boundary layer with heat transfer affected by a wake of a square bar,” J. Fluid Sci. and Tech. 2014.
- S. Xia, Y. Ito, K. Nagata, Y. Sakai, H. Suzuki, O. Terashima and T. Hayase , “DNS study on the development of boundary layer with heat transfer under the effects of external and internal disturbances,” J. Fluid Sci. and Tech. 2014.
- H. Suzuki, K. Nagata, Y. Sakai, T. Hayase and Y. Hasegawa , “An attempt to improve accuracy of higher-order statistics and spectra in direct numerical simulation of incompressible wall turbulence by using the compact schemes for viscous terms ,” Int. J. Numer. Meth. Fluids, 2013.
- Y. Sakai, K. Nagata and H. Suzuki, “Relationships between large-scale coherent motions and bursting events in a turbulent boundary layer” (in Wind Tunnels and Experimental Fluid Dynamics Research), INTECH, 2011.
- K. Nagata, Y. Sakai and S. Komori, “Effects of small-scale freestream turbulence on turbulent boundary layers with and without thermal convection,” Phys. Fluids, 2011.