Pengurangan drag akibat pengaruh plasma actuator pada coherent structure di model geometri box = Drag reduction due to plasma actuator effect on the coherent structure of a box geometry model

Riza Farrash Karim, author

Abstrak

Kontrol aliran aktif dengan plasma actuator telah terbukti dapat memanipulasi aliran. Namun aplikasinya untuk mengurangi drag pada objek box masih terbilang minim. Terutama pada coherent structure yang merupakan salah satu karakteristik aliran di belakang objek squareback, padahal perannya dalam mengurangi drag cukup signifikan. Pada penelitian ini kemudian mencoba untuk mengamati pengaruh plasma actuator kepada coherent structure-nya. Konfigurasi plasma actuator diletakkan pada bagian dinding belakang dari objek atau tegak lurus dengan arah datangnya aliran. Pengujian dilakukan di bilangan Reynolds 13000-40000. Pengurangan drag paling maksimum sebesar 15.36 berhasil diraih pada bilangan Reynolds paling rendah. Sedangkan hasil visualisasi menunjukkan adanya kenaikan tren kecepatan dan pertumbuhan coherent structure dan pendekatan posisi pembentukan recirculating bubble. Hasil dari simulasi menunjukkan pengecilan ukuran recirculating bubble dan kenaikkan tekanan di belakang objek. .....Active flow control with plasma actuator has been proven to manipulate the flow. But the application in order to reduce the drag in a box object is still limited especially on the coherent structure, which in fact, is one of the flow characteristic behind squareback objects even though its role in reducing drag is quite significant. This research, tried to observe the effect of plasma actuator to coherent structure in terms of reducing drag. The plasma configuration was placed perpendicular to the freestream flow on the base wall. The test was conducted in Reynolds number of 13000 40000. The highest drag reduction percentage of 15.36 was achieved in the lowest Reynolds number. Meawhile the result of the visualization shows the ascending trend of coherent structure velocity and growth also the recirculating bubble generation position to be closer. The result of the simulation shows recirculating bubble size was decreased and the base pressure was increased.