

Characteristics of vortex ring formation by synthetic jet actuators in different cavities

Engkos Achmad Kosasih, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=9999920530366&lokasi=lokal>

Abstrak

This paper presents a baseline study of the development of turbulent flow separation for controlling aerodynamic phenomena, especially in the design of the vehicle body. The purpose of this study was to analyze the performance of synthetic jet actuators (SJAs) as one of the tools that can be used in reducing the flow controller separation area on the bluff body model of the vehicle. To get maximum results in the performance of the SJA, this research starts with characterizing the actuator, including changes in the shape of the cavity and orifice diameter. Cavity shapes tested were half-ball (B), tube (T) and cone (K), while orifice diameters of 3, 5 and 8 mm were examined. The study was conducted using both computational and experimental approaches. Results from both types of research methods were compared and displayed in graphical form. These results serve as a reference for determining future research. The experimental results, in the form of the flow rate for each type of cavity, determined the ability of different cavity conditions to form vortex rings, whereas in CFD simulations, the formation of vortex rings was demonstrated via the visualization of flow contours. Vortex rings occurred in cavity conditions B3, T3, T5, K3 and K5. Vortex rings were not formed on any type of cavity with an orifice having a diameter of 8 mm.