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# Influence of Interaction of Two Pulsating Jets with Phase on Flow Characteristics

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## Extended Abstract

Jet flow control was attempted in terms of the jet flow width, attenuation process of the jet flow center velocity, and jet flow direction. Most of these methods are based on geometrical approaches, such as changing the nozzle shape of the jet flow outlet. The application of synthetic jets as jet flows has allowed dimensionless frequency to control the width and direction of the jet flow [1]. However, achieving a large momentum in synthetic jets is challenging, and there are issues to be overcome when applying synthetic jets to large fluid machinery. Therefore, a pulsating jet with a frequency parameter and a net flow rate is effective for applying jet flow technology to control large-fluid machinery and other applications.

It is possible to adjust the vortex arrangement downstream of the slot for pulsating jet flows under a large flow fluctuation amplitude to control the jet flow structure [2,3]. More recently, changing the velocity distribution at the jet flow outlet was found to change the vortex arrangement and adjust the jet flow width [4]. In addition, the interference problem between the two synthetic jets was discussed, showing that the flow rate depends on the phase of the exit velocity and no synthetic jet is formed when the phase is π [5]. However, the effect of the dimensionless amplitude $U_{pa}^{¿}$ (ratio of amplitude due to the velocity fluctuations to flow velocity of the steady velocity component) on the flow field in situations where the two pulsating jet flows are in phase π and the flow rate is not time-varying remains unknown. In this experimental study, the dimensionless amplitude was used as a parameter in two pulsating jets with exit velocity phase π. The characteristics of the jet flow generated at this time were discussed. Pulsating, hybrid synthetic, and synthetic jets, with $U_{pa}^{¿}=0.5, 4.0, \infty$, respectively, were presented as typical examples. The representative velocity $U_{pm}=6.0[m/s]$ was measured under constant conditions for flow visualization and velocity distribution measurements. For $U_{pa}^{¿}=0.5$, a flow similar to that of a steady jet flow was generated; for $U_{pa}^{¿}=4.0$, an inverse Karman vortex was formed, although the generated flow rate was lower; for $U_{pa}^{¿}=\infty$, no jet flow was generated. These results indicate that jet flow formation is determined by the dimensionless amplitude of the jet flow and velocity fluctuations can control the jet flow structure.

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