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Three-dimensional Instability in the Wake of Two Side-by-side Square Cylinders¹ CHOON-BUM CHOI, Inha University, Korea, YONG-JUN JANG, Korea Railroad Research Institute, Korea, KYUNG-SOO YANG, Inha University, Korea — Three-dimensional instability in the flow past two square cylinders in side-by-side arrangements has been numerically studied via a Floquet stability analysis. The distance between the neighboring faces of the two cylinders (G) is the key parameter which affects the secondary instability under consideration. In this talk, we present the critical Reynolds number for the 3D instability and the spanwise wave number corresponding to the most unstable (or least stable) wave for each G . When the two cylinders are close to each other, the Floquet mode resembles mode A of flow past a single cylinder. For large G , the Floquet mode for each cylinder is independent of the neighboring cylinder as expected. In the range of intermediate G , interference of the two wakes is clearly reflected in the Floquet mode. We also discuss about the effect of gap flow, and visualization of the dominant 3D vortical structures is provided by using Q contours. Our results shed light on a complete understanding of the onset of 3D instability in the presence of two side-by-side square cylinders.

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