

הנדך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ה' 20.12.2018
(יב' בטבת, תשע"ט), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: דניאל קובלב

מנחה: פרופ"מ רנה ואן האוט

על הנושא:

Tomographic PIV measurements of the flow field in the wake of a tethered sphere undergoing vortex induced vibrations

The seminar will be given in Hebrew

תקציר ההרצאה:

The 3D flow field in the wake of a negatively buoyant ("heavy") tethered 6 mm sphere undergoing vortex induced vibrations (VIV) in a water tunnel, was measured using tomographic particle image velocimetry (tomo-PIV). The flow field was investigated for different reduced velocities ($U^* = \frac{U f_n}{P}$, U - free stream velocity, f_n - natural frequency of the tethered sphere in the fluid, D - sphere diameter) ranging between $3.4 < U^* < 35$, corresponding to Reynolds numbers ranging between $382 < Re(= UD/\nu) < 4049$. The dynamics of the sphere at each U^* were measured and the relation between the dynamics and the wake was investigated. At $U^* = 3.4$, the sphere's oscillations were negligible and the shed vortices resembled a train of "hairpin" heads having a vertical plane of symmetry which developed into vortex rings further downstream. At $U^* = 5.5$, corresponding to the "lock-in" region, the sphere's oscillations were highly periodic with large transverse amplitudes, and "omega-shaped" vortices having a horizontal plane of symmetry were shed from alternating sides of the sphere, transforming into vortex rings further downstream while still connected to upstream structures by a "bridging-vortex" - a thin vortex filament. At higher U^* values, $U^* = 7.5$ and 12.5 , the sphere's transverse amplitude response was intermittent and vortices in the sphere's wake were characterized by longitudinal and vertical "struts" as well as "arches", with seemingly little organization varying with the oscillation amplitude, i.e when the oscillations were relatively small, the shed structures were more organized and resembled previously seen structures, whereas when the oscillations increased, the structures were less clearly ordered.

בברכה,

ד"ר אוריאל סאס

מרכז הסמינרים