

## 비압축성 균질유체의 스핀업 통합이론

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## Unified Theory of Spin-Up in an Incompressible Homogeneous Fluid

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**Key Words:** Spin-up (스핀업), Incompressible homogeneous fluid (비압축성 균질유체), Ekman number (에크만 수), Vorticity (와도)

**Abstract :** A unified theory is made of spin-up flows in an incompressible homogeneous fluid, in which the system Ekman number is assumed to be very small enough to ensure the boundary layer flows near the container walls and Taylor-Proudman column flow in the inviscid interior region. By way of finding out proper physically acceptable time scaling, spin-up theories about linear ( $\epsilon \rightarrow 0$ ) and nonlinear cases ( $\epsilon \rightarrow 1, 0$ ), which have already well-established, respectively, in some different each ways but those are still being an incomplete theory because they do not converge to each other in the limit cases, have successfully unified on a unique theoretical fundamentals.

## 비평면 지면위를 비행하는 FAST 동체의 공력특성

조정보<sup>†</sup> · 한철희<sup>\*</sup> · 조진수<sup>\*\*</sup>(한양대)Aerodynamic Characteristics of Future-Air-Speed-Transit (FAST)  
Fuselages Flying over Non-planar Ground Surfaces

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**Key Words:** WIG effect(지면효과), Boundary Element Method(경계요소법), Channel(수로형 안내로), High Speed Ground Transportation(초고속 운송체)

**Abstract :** Recently, there has been efforts to develop a new transporter that can move faster with low fuel consumption. In Korea, a ground transporter called as FAST(Future-Air-Speed-Transit) is proposed to move inside the channel using linear motors and to lift its body using both air-lift and wing-levitation. To design the vehicle, it is important to understand the effect of the nonplanar ground surface on the aerodynamic characteristics of the vehicle bodies. The aerodynamic characteristics of several FAST vehicle bodies moving over nonplanar ground surfaces are studied using a boundary element method. The effects of several design factors such as body cross-section shape, ground height, and gap between the body and the fence will be discussed in this paper.