

Abstract Submitted  
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**Numerical verification of the possibility of application of Clebsch transformation to the non-canonical Hamiltonian systems** YEONTAEK CHOI, CHANGHOON LEE, Yonsei University, Korea — The Clebsch transformation is a well-known gauge transformation in fluid mechanics. One can derive a useful and controllable equation system (e.g. four wave system in Wave Turbulence) from the original one through using Clebsch variables. But because of the non-uniqueness and the locality of the Clebsch fields, there are some limitations to their application to the non-canonical dynamical system such as the Navier-Stokes equation (NSE), although the Clebsch transformation plays a crucial role in the case of inviscid and incompressible fluid system. We study the Clebsch variables numerically, i.e. through the direct numerical simulations of isotropic homogeneous turbulence we investigate the possibility of the application to the non-local conjugate variable system, e.g. NSE. Therefore we will predict numerically the extent of the locality of the Clebsch fields. This means we can have a criteria to apply those transformations to the NSE turbulence structure.

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