Symmetries of the Beltrami Fields in the Frame of the Dual Stream Function Representation

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We calculate new symmetries of the stationary three-dimensional Euler equations introducing a potential that is based on the so-called dual stream function representation of the steady state velocity field $\boldsymbol{u}$ in general locally. First, we expose Lie point symmetry analysis of the Beltrami fields. We show that the Lie algebra admitted by Beltrami fields contains as a subalgebra the infinite-dimensional Lie algebra which generates the Lie pseudo-group of the conformal transformations of the dual stream function potential. Then we demonstarte that this enables us to make the classification of the two-dimensional manifolds $\boldsymbol{M^2}$ wherein the dual stream function potential is charts of this manifold.