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ON THE COHERENCE OF SYNTHETIC TURBULENCE GENERATION METHODS

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Abstract. Synthetic turbulence generation methods have been extensively used by engineers and scientists in the past ten years in order to impose initial conditions in a wide range of turbulent flow problems. The interest in synthetic methods relies in the fact that reliability of methodologies such as large eddy simulation (LES) or direct numerical simulation (DNS) strongly depends on how well the developed turbulence is characterized, which generally leads to computationally expensive simulations. In this work the methodology known as "modified discretizing and synthesizing random flow generation" (MDSRFG) jointly with a LES method is analyzed for its use in the study of bluff body aerodynamics. A comparison with other generation techniques, that are closely related by their features and their conceptual origins, is presented with particular emphasis on the correct representation of the coherence of the velocity field. The resulting wind loads on the model, along with the statistical characteristics of the flow, show that the MDSRFG technique allows to represent a field of spatially correlated velocities correctly.