

Automated pathway for assessing flow dynamic in urban area

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In urban environment Computational Fluid Dynamics (CFD) is applied to assess and predict the air dynamic around buildings in order to secure the comfort of pedestrians and loading capacity of constuctions.

In this paper we present an automated pathway for simulating the wind flow in urban areas. Our computational framework has the aim to automate the scientific software process by relying on general implementations and code generation, for robustness and accuracy. We apply the finite element problem solving environment DOLFIN [1, 2] and the unified continuum mechanics solver Unicorn [3], where we focus on turbulent modeling, adaptivity and high performance computing.

The numerical simulations are compared and validated against benchmark tests [4] and real application cases are applied to illustrate the capacity of our framework.

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