Predictive Modeling of Fluid Flows Using Conditional Score-based Diffusion Models

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Résumé

Advances in computational power have made turbulent field simulations central to many disciplines, yet traditional solvers struggle to deliver fast flow estimations due to the inherent chaotic nature of the problem. More recently, diffusion models have set new benchmarks in generative modeling for similar problems. In this regard, we propose a data-driven conditional score-based diffusion model for transonic fluid flow prediction, integrating an energy constraint based on the flow statistics to enhance temporal stability.
Diffusion models aim at generating new samples from a dataset

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