

# **GPU based Fluid Structure Interaction using Immersed Boundary Methods**

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## **Abstract**

Engineering applications often require fast, accurate solutions of fluid flow around freely moving bodies. The massive parallelism enabled by GPU architecture enables high performance, offering a promising alternative to traditional solver acceleration via multicore CPUs. However, fully harnessing GPU parallelism requires specialized algorithms and computing strategies. This work modifies direct-forcing immersed boundary methods to model fluid-structure interaction and investigates its behavior on GPUs. Verification of the solvers is done using lid-driven cavity flow, impulsively started flow over a cylinder, flow over a forced oscillating cylinder and vorticity induced vibration.

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