

**El Zahab, Z.; Divo, E.; Kassab, A. J.**

**A localized collocation meshless method (LCMM) for incompressible flows CFD modeling with applications to transient hemodynamics.** (English) Zbl 1244.76073

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Summary: The current paper reports on the development and validation of a localized collocation meshless method (LCMM) to model laminar incompressible flows. A high order upwinding scheme was devised to dampen the numerical oscillations arising in convection-dominated flows. Subsequently, the LCMM was analytically validated and demonstrated to yield third-order accurate solutions when compared to a benchmark analytical decaying vortex solution. Numerical validations are provided by comparison with the finite volume commercial (FVM) solver Fluent 6.2. The flow geometry for the numerical validation arises from a biomedical application that consists of modeling blood flow in the inter-connection between a bypass graft and an artery. Very good agreement was found between the LCMM and the FVM.

**MSC:**

**76M25** Other numerical methods (fluid mechanics) (MSC2010)  
**76D05** Navier-Stokes equations for incompressible viscous fluids  
**76Z05** Physiological flows  
**92C35** Physiological flow

Cited in **13** Documents

**Keywords:**

meshless methods; CFD; upwinding; limiters; incompressible flows

**Software:**

Mfree2D

**Full Text:** [DOI](#)

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