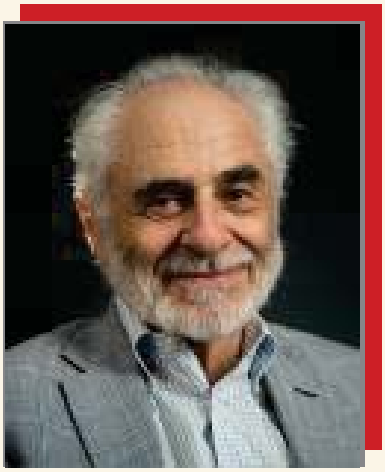
MAR 09, 2017

Fully resolved simulation of particulate flows



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ABSTRACT:

The paper will start by briefly describing the Physalis method for the fully resolved simulation of Navier-Stoked fluid flows with suspended spherical particles. Several applications will then be described. A method to extract the speed of concentration waves from the simulations of a fluidized-bed-like system is outlined and the results are compared with information available in the literature. The statistical geometry of the evolution of particle tetrads in the same system is described. The statistics of the rotation of a particle immersed in an incident turbulent flow is compared with the statistics of the flow vorticity. The extension of the method to deal with particle-fluid heat transfer will be described. Several other results will be briefly shown to demonstrate the capabilities of this simulation method.

BIOGRAPHY:

Andrea Prosperetti holds a doctorate in Engineering Science from Caltech. He joined the Department of Mechanical Engineering of the Johns Hopkins University as fiull professor in 1985. In July of this year he moved to the Department of Mechanical Engineering of the University of Houston. He has also held a part-time professorship at the University of Twente in The Netherlands since 1999. Prosperetti's interests are in multiphase flows (chiefly drops, bubbles and, more recently, particles), theoretical and computational fluid mechanics and applied mathematics. Among his other activities, he is the editor in chief of the International Journal of Multiphase Flow.