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MODELLING AND SIMULATING AIR FLOW WITH DISPERSION OF FINE PARTICLES IN INDOOR AC ROOMS

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ABSTRACT

Modelling of indoor air-velocity distribution, temperature distribution, pressure variation, air-particulate transmission and path tracking can be a complex mission and where the coupled physics is also given in non-linear and multi-phenomenon. In this study, two fixed orientation models of air-conditioner positions were considered for investigating an air flow movement which entered through a single inlet. Inlet air parameters; supply velocity and temperature were measured using a Thermo-Anemometer. Proposed study, differential physics phenomenon were selected, those are laminar flow, heat transfer in fluids and particle tracing for fluid flow and so forth. Further, stationary and time dependent solvers are chosen for the parameter simulation. In two different orientation models, input values, boundary conditions and initial conditions are applied identically. To solve the physics of laminar flow and heat transfer stationary solvers were applied initially during the computation. After that physics of particle tracing for fluid flow is solved to find a stationary solution by time dependent solver. The second model has shown enhanced air flow movement, velocity distribution and temperature distribution than that of the first model. Proposed method realizes the air-flow pattern of given air-conditioned room with presence of static disturbances and results are verified with the existing experimental outcomes from cited literature.

Keywords: Multi-physics, laminar flow, Thermo-Anemometer, particulate transmission, air-condition