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Computational Fluid Dynamics Simulations of Thermal and Flow Fields inside a Desktop Personal Computer Cabin

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Abstract : In this paper, airflow analysis inside a desktop computer case is performed by simulating computational fluid dynamics. The purpose is to investigate the cooling process of the central processing unit (CPU) with thermal capacities of 80 and 130 watts. The airflow inside the computer enclosure, selected from the microATX model, consists of the main components of heat production such as CPU, hard disk drive, CD drive, floppy drive, memory card and power supply unit; According to the amount of thermal power produced by the CPU with 80 and 130 watts of power, two different geometries have been used for a direct and radial heat sink. First, the independence of the computational mesh and the validation of the solution were performed, and after ensuring the correctness of the numerical solution, the results of the solution were analyzed. The simulation results showed that changes in CPU temperature and other components linearly increased with increasing CPU heat output. Also, the ambient air temperature has a significant effect on the maximum processor temperature.

Keywords : computational fluid dynamics, CPU cooling, computer case simulation, heat sink
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