EFFECT OF RADIANT TEMPERATURE ASYMMETRY ON VERTICAL PROFILE OF INDOOR AIR TEMPERATURE DIFFERENCES

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Local or distributed heating systems are often source of non-uniform thermal environment including indoor air velocity flow field and radiant and global or operative temperatures. The airflow and temperature fields around a human being determinate magnitude of the person's thermal sensitivity, thus causing certain level of its discomfort. To quantify that specific kind of human's sensitivity were proposed several parameters which are mainly based on statistical evaluation [1], [2]. In our study are used the same qualities on which are the statistical parameters based in order to prevent the non-uniform thermal state by means of input control signal of controllers of heaters. The basis is multi-parameter maps which content basics quantities measured in the space or acquired indirectly. Then was assembled a group of matrixes which contains all possible thermal states. Thus, the control input signal just picks up the targeted vector state and readjusted the control units of the heater.

The controlled space is equipped with conventional heater and the radiant infrared heater. The possible local discomfort is evaluated through above mentioned temperatures, respective their differences: according to the ISO 7730 [4] a 3°C air temperature difference between head and feet gave a 5% dissatisfaction level of presented occupant mainly at sedentary activity. Simultaneously is assessed the asymmetry of thermal radiation and both quantities became the controllers' input signals upon which action are both heaters' powers readjusted.

Keywords:

Indoor thermal comfort, asymmetry of thermal radiation, CFD model, local mean air velocity, thermal sensitivity parameter, thermal radiation field, radiant heater.

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