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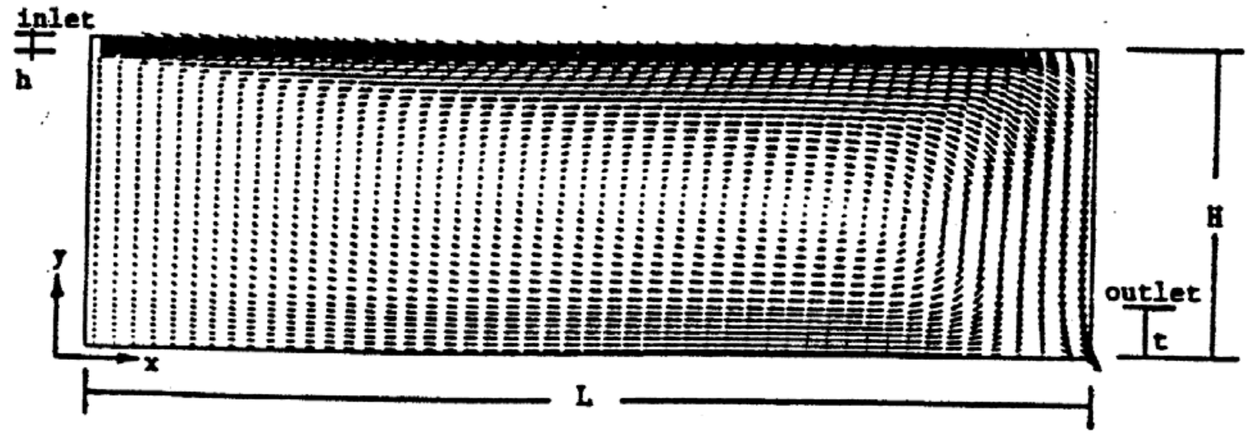
In this article five *k-ε*, two-equation models are studied: the standard *k-ε* model, a low-Reynolds-number *k-ε* model, a two-layer *k-ε* model, a two-scale *k-ε* model, and a renormalization group (RNG) *k-ε* model. They are evaluated for their performance in predicting natural convection, forced convection and mixed convection in rooms, as well as for an impinging jet flow. Corresponding experimental data from the literature are used for validation. It is found that the prediction of the mean velocity is more accurate than that of the turbulent velocity. These models are neither able to predict anisotropic turbulence correctly nor to pick up the secondary recirculation of indoor air flow; otherwise the performance of the standard *k-ε* model is good. The RNG *k-ε* model is slightly better than the standard *k-ε* model and is therefore recommended for simulations of indoor air flow. The performance of the other models is not stable.



The forced-convection case with sketch and computed velocity vector.