**General goal: get familiar with the code: where does what?**

# Problem 3: two-dimensional steady convection-diffusion of a compressible flow

Consider the flow of air in a heat exchanger:

v∞ = 0.02 m/s

T∞ = 273 K

T = 373 K

T = 373 K

The steady flow in the heat exchanger can be described by the following equations:

The viscosity, *μ*, the thermal conductivity, *k* and the density, *ρ* are dependent upon the temperature. The temperature dependencies are already programmed in the computer code. The density is calculated through the ideal gas law:



You can place baffles in the heat exchanger through source terms in the routine ‘ucoeff’. See page 267 of the book (*page 193 in the first edition*) for a full explanation.

**Assignment:**

Investigate the influence of number, size and position of baffles on the performance of the heat exchanger. Note: the performance involves both the temperature increase of the fluid and the pressure drop over the heat exchanger.