

Two different approaches for the effective conductivity investigation of 2D porous materials with temperature dependent material properties

Abstract

The effective conductivity of 2D porous materials with temperature dependent matrix properties is investigated by two different approaches: namely, a numerical and an analytical method. A model with disjoint parallel cylindrical pores in a representative cell is considered. The numerical method is represented by the finite element method. In the scope of the analytical method, the nonlinear boundary value problem which describes conducting properties of the materials is solved by the methods of complex analysis, and the effective conductivity is represented in an explicit form via the solution of this problem. The values of the effective conductivity obtained by two these methods are compared.