

---

# The Evaluation of the Equivalent Thermal Conductivity at Radiation Transfer in a Spherical Cavity

© V.S. Zarubin

Bauman Moscow State Technical University, Moscow, 105005, Russia

*In the presence of pores in solids, it is necessary to take into account the heat transfer by radiation in the pores while determining the effective thermal conductivity of such solids. The paper presents a mathematical model describing the heat transfer by radiation in a spherical cavity, the shape of which can be seen as a statistical average with respect to the forms of closed pores in solids. The model allows us to determine the equivalent thermal conductivity of the conventional solid medium filling the pore that enables to consider the material with a porous structure as a continuous inhomogeneous solid. The model adequacy analysis is carried out and the evaluation of a possible error in the equivalent thermal conductivity calculation is obtained. The calculated dependence for this coefficient is compared with similar in structure formulae derived on the basis of different approaches to accounting the heat transfer by radiation in the pores.*

**Keywords:** spherical cavity, mathematical model of radiation transfer, equivalent thermal conductivity.

**Zarubin V.S.**, Dr. Sci. (Eng.), Professor of “Applied Mathematics” Department of Bauman Moscow State Technical University. e-mail: zarubin@bmstu.ru

---