RADIATIVE CONDUCTIVITY OF NON BEERIAN POROUS MEDIA : APPLICATION TO DEGRADED ROD BUNDLES OF A NUCLEAR CORE

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ABSTRACT A 3D numerical model of a degraded experimental small-scale facility, simulating an opaque rod bundle of a nuclear reactor core has been built from γ-ray tomography images. It has been directly characterized by both extinction cumulated distribution functions G_{ext} and scattering phase functions p. G_{ext} strongly differs from the exponential function associated with the Beer law and p strongly depends on both the incidence and the scattering directions. By assuming a diffuse wall reflection law, we have directly determined a radiative conductivity tensor with a numerical perturbation method of the generalized radiative transfer equation, associated with the previous statistical functions and introduced by Taine *et al.* Only the diagonal radial and axial components of this tensor are not null. They have been fitted by a simple law, only depending on the porosity, on the specific area and on the wall absorptivity.