

The problem of calculating the effective dielectric constant of a composite material ϵ_e is analyzed by separating out the dependence of ϵ_e on the microscopic geometry. A set of characteristic geometric functions is defined, which depend in detail on the microscopic geometry of the material under discussion, but whose general analytical properties can be derived. It is experimentally observable in certain optical and microwave experiments on metal-insulator composites. The pole structure of these functions is shown to have important consequences.