Modeling Diffuse-Gray Radiation via Noncompact Integral Operators on Polyhedral Domains and/or in Transient Settings

Peter Philip

Universität Ludwig Maximilian München

Abstract: While the modeling of stationary diffuse-gray radiation results in compact integral operators K in the radiosity equation,provided the domain is sufficiently smooth, it will be shown that compactness fails on polyhedral domains. However, using techniques that do not use the compactness of K, one can still show that 1is a simple eigenvalue of K for connected enclosures.One can also still prove an invertibility result,important for coupling the radiosity equation to conductive heat transfer equations. When reinterpreted in a transient setting, K can never be compact, independently of the smoothness of the domain.

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