Modeling Random Heterogeneous Materials Via Lower-Order Statistics

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Can two-point correlation functions be identified that can be manageably measured and yet reflect nontrivial higher-order structural information about the textures? By probing the information content of the widest class of different types of two-point functions examined to date, we show that a superior descriptor is the two-point cluster function $C_2(r)$, which is sensitive to topological connectedness information. We demonstrate the utility of $C_2(r)$ by accurately reconstructing a sphere packing shown in (a).



The image shown in (d), which uses C_2 , gives the best rendition of the orginal packing, shown in (a).