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Anisotropic covering of fractal sets

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(Submitted on 17 Apr 2012)

We consider the optimal covering of fractal sets in a two-dimensional space using ellipses which become increasingly anisotropic as their size is reduced. If the semi-minor axis is \epsilon and the semi-major axis is \delta, we set \delta=\epsilon^\alpha, where 0<\alpha<1 is an exponent characterising the anisotropy of the covers. For point set fractals, in most cases we find that the number of points N which can be covered by an ellipse centred on any given point has expectation value < N > ~ \epsilon^\beta, where \beta is a generalised dimension. We investigate the function \beta(\alpha) numerically for various sets, showing that it may be different for sets which have the same fractal dimension.

Submission history

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