Partially Fractal Impedance Networks

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We analyse linear networks of impedances in the case when the impedances at every level differ by a factor of b from those at the previous level. Such networks can be used as models for rough surfaces, in which case there will exist a level of finest detail which must be taken into account in any calculation. We obtain an exact expression for the ratio of the impedance of the network to the outer impedance for an arbitrary number of elements in the network. We show that this class of networks shows a transition from a fractal geometric structure to a non-fractal structure according to the value of b. However, their effective impedance is never fractal.

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