**Public Transport Networks: Fractal Properties**

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Public transport networks (PTNs) are often discussed without reference to their geographical embedding. The question arises if there is any underlying structure or principle characterising the observed behaviour of geographically embedded transport routes. Here, we analyse transport routes with respect to their fractal properties in terms of random walks, self-avoiding walks and Levy flights. For routes optimizing the time of passenger travel one may expect distance to grow linearly with the path length $L$. Surprisingly, the empirical data show quite a differen tbehavior. Forall means of transport analyzed within this study the dependence of the mean square distance $\langle R^2 \rangle$ on $L$ is well described by a power law with an exponent that is significantly smaller than two. For most transport routes this power law appears to be close to that known for the self-avoiding walk. Furthermore, the analysis of the distribution of station intervals along routes displays a range with power law behaviour. This indicates that the travel along these routes may in part also be described as Levy-flights. This property may allow passengers to choose optimised routes.

Applying results of polymer theory to radial bus-networks of starlike shape we further show that the fractal behaviour allows to reduce passenger travel times at lower cost.