1000-52-137   **Robert M. Owczarek*** (`robert@sulphurcanyon.com`), 59 Coryphodon Ln, Jemez Springs, NM 87025. *Is there a relationship between geometry of complex networks and the 1/f noise?* Preliminary report.

Many complex networks known in nature are scale-free in the sense of a power form of degree distribution in the network. Such behavior characterizes also so-called 1/f noise. More exactly, the power spectrum for the noise is of the 1/f form. The universality of the noise and network scale-freeness raises question if there is a connection between the two. I will argue in the affirmative in the talk. First, I will talk about the description of complex networks in terms of graphs. Also description of graphs in noncommutative geometry terms will be reminded. Then I will give introduction to the phenomenology of 1/f noise as well as to some existing theoretical approaches to explain the effect. Afterwards I will give arguments for treating rather general physical systems, in which 1/f noise can appear, in terms of diffusion-like phenomena on complex networks. Since, as physicists show, such networks tend to be scale-free, this explains power-like dependence of the noise. The fact that the diffusive motion on a network is quasi-one-dimensional and not two- or three-dimensional provides then the proof for the 1/f dependence of the power spectrum. (Received August 23, 2004)