Exact Renormalization of Super-Diffusion on the Tower-of-Hanoi Network STEFAN BOETTCHER[1], BRUNO GONCALVES[2], Physics Department, Emory University — We propose the Tower-of-Hanoi network as a hierarchical, small-world network possessing both, geometric and long-range links. Modeling diffusion via a random walk on this network provides a mean-square displacement with an exact, anomalous exponent $d_w = 2 - \ln(\phi)/\ln(2) = 1.30576\dots$. Here, $\phi = \left(1 + \sqrt{5}\right)/2$ is the "golden ratio" that is intimately related to Fibonacci sequences. This may be the first solvable model with super-diffusion for any fractal structure. This appears to be also the first known instance of any physical exponent containing ϕ. It originates from an unusual renormalization group fixed point with a subtle boundary layer. The connection between network geometry and the emergence of ϕ in this context is still elusive.

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