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Dana D Clahane* (dclahane@math.uci.edu). *Fractal membranes and weighted composition operators*. Preliminary report.

M. Lapidus and R. Nest have proposed the notion of a fractal membrane as an “adelic” product of a sequence of intervals with given lengths (or domains in some Euclidean space with the given positive real number lengths) endowed with some Hilbert space of functions, such as L^p of each interval in the product, and a suitably chosen operator that is a sum of operators on the factor Hilbert spaces in a restricted tensor product of these Hilbert spaces. Each of these operators B_j on the Hilbert space, say $L^2(I_j)$, is taken to be some variant of the square root of the Laplacian with Neumann boundary conditions on I_j . We will study the situation in which the operators B_j are replaced by another operator, in this case, $\log W_{\psi_j, \phi_j}$, where ϕ_j is a suitably regular self-map of the j th domain or interval, ψ_j is a similarly nice function on that domain for each counting number j , and W_{ψ_j, ϕ_j} is the weighted composition operator viewed as acting on the j th Hilbert space factor in the restricted tensor product, and defined by $W_{\psi_j, \phi_j}(f) = \psi_j(f \circ \phi_j)$. We will compare properties of the spectral partition function in this situation to the situation where the Laplacian square root operators are used. (Received December 04, 2012)