Random quantum graphs are asymmetric

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The study of quantum graphs emerged from quantum information theory. One way to define them is to replace the space of functions on a vertex set of a classical graph with a noncommutative algebra and find a satisfactory counterpart of an adjacency matrix in this context. Another approach is to view undirected graphs as symmetric, reflexive relations and "quantize" the notion of a relation on a set. In this case quantum graphs are operator systems and the definitions are equivalent. Doing this has some consequences already for classical graphs; viewing them as operator systems of a special type has already led to the introduction of a few new "quantum" invariants.

Motivated by developing the general theory of quantum graphs, I will take a look at random quantum graphs, having in mind that the study of random classical graphs is very fruitful. I will show how having multiple perspectives on the notion of a quantum graph is useful in determining the symmetries of these objects – as expected, a generic quantum graph is asymmetric.