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John C. Baez* (baez@math.ucr.edu), Department of Mathematics, University of California, Riverside, CA 92521. *Groupoidification*.

There is a systematic process that turns groupoids into vector spaces and spans of groupoids into linear operators. “Groupoidification” is the attempt to reverse this process, taking familiar structures from linear algebra and enhancing them to obtain structures involving groupoids. Like quantization, groupoidification is not entirely systematic. However, examples show that it is a good thing to try! For example, groupoidifying the quantum harmonic oscillator yields combinatorial structures associated to the groupoid of finite sets, while groupoidifying the q -deformed oscillator yields structures associated to finite-dimensional vector spaces over the field with q elements. Starting with flag varieties defined over the field with q elements, we can also groupoidify Hecke and Hall algebras. (Received September 08, 2008)