1107-68-259 **Paul C. Kainen*** (`kainen@georgetown.edu`). *Correcting error in groupoid diagrams.*
In a groupoid category, all morphisms are invertible and diagrams include inverses. We suppose that correct computation should produce commutative diagrams - i.e., the composition of the morphisms in each cycle is an identity. In a hypercube, squares correspond to the 4-cycles. It is shown that commutativity of a groupoid hypercube diagram in dimension $d \geq 3$ cannot fail unless at least $d-1$ of the component squares do not commute. By Hechler and Kainen (Israel J. Math, 1974), for any groupoid-valued commutative diagram $\delta : D \to \mathcal{G}$ on the scheme of acyclic D, there is a subdivision of D embeddable in some hypercube Q_d and there is a commutative diagram $\zeta : Q_d \to \mathcal{G}$ extending δ. Commutativity of a special basis of the hypercube cycles guarantees commutativity of the hypercube and of any diagram embedded there. Arguments utilize topological enrichment of cycle basis. Applications include quantum computing and algebraic models in biology and cognitive science. Such systems could in principle correct error which stays below the threshold and amplify computational power by extrapolating from the squares in the special basis to the exponentially many cycles in the hypercube. (Received January 21, 2015)