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Hidden treasures in 2×2 *linear systems—applications of non-orthonormal coordinate systems.*

A consistent $n \times n$ linear set of equations sets up a coordinate system which may not be orthonormal. This talk focuses on several applications of such derived vector spaces in R^2: density of lattice points in the plane intersected by the new axes, transformations of functions, calculus in a non-orthonormal vector space, including double integration using Jacobians, and applications of eigenvectors. Thus we can take a mundane 2×2 set of linear equations and find rich, visual applications to linear algebra and other branches of math. (Received September 25, 2012)