

A GRAMMAR OF GRIDS

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Here at the end of the twentieth century, no symmetry is more familiar, perhaps, than that of new cities and of graph paper: the hegemonic square grid. Yet of the arbitrarily many different ways in which this symmetry can be broken, we typically encounter only the ordinary "perspective trans of conventional visual art. Such transformations usually represent changes of point of view --- navigation on a gridded or displacement in flat Euclidean space. Diverse other modes of grid asymmetry that represent Metamorphosis of an object under inspection are much less often scrutinize proposed plenary presentation I will review the graphics and natural origins of two families of these broken symmetries, corresponding to two quite different classes of "features" for studies in which underline formation conveys underline formation. Features of this nature lie at the core of a new approach to the information content of biomedical image that, once it becomes more widely known, should constitute a branch of the applied symmetry investigations that concern the ISIS community so deeply.

One large class of these features of symmetry-breaking arises from the analogy between grid deformations and the familiar analytic geometry of a landscape's "peaks" or "pits" and "passes." In morphometrics, these arise as two eigen vectors of a parti representation of image energy. But a second, more complex class of features, only recently encoun in this context, corresponds to a novel non-generic singularity of maps on Euclidean space. These deformation functions look like the prototype (x,y) right arrow (x, x^2y+y) in the figure on the next page. Any deformation that is not (affine) shear generates one hierarchy of singularities of this sort is extrapolated by arbitrary positive multiples, and another extrapolation by arbitrary negative multiples. As the figure suggests, this asymmetry can be further broken by an affine transformation, leading to a rich collection of descriptors help convey the spatial structure of a wide variety of real phenomena.