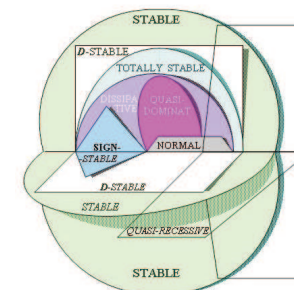


## Stronger-than-Lyapunov notions of matrix stability, or how “flowers” help solving problems in multi-species community dynamics

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Persistent patterns of species intra- and inter-relations in a community of  $n$  interacting species may imply a number of formalizations as special, stronger-than-Lyapunov, notions of matrix stability, like D-stability, qualitative stability, or Volterra dissipativeness. A variety of these notions, each having a certain interpretation in terms of uncertainties inherent in model applications, constitute a hierarchical topology, sometimes very intricate and not yet well-understood, in a formal space of real  $n \times n$ -matrices. As visible forms of this hierarchy, the author suggests Matrix Flowers where 'petals' correspond to subsets of particular stability kinds, whose visible inclusions represent logical implications. In the absence of ready characterizations, to draw a 'petal' often poses a challenging mathematical problem, whose solution may, however, reveal a new biological knowledge of a general nature. Several stories behind particular 'petals' include popular topics like those of strong and weak interactions in a community, 'key' species in the structure, diffusion instability.



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