Dynamic networks and templates: from hardwiring to temporal behavior

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Behavior under iterations of quadratic maps has been one of the earliest and most studied topics in discrete dynamics, in both the real and complex case. However, many subtler aspects of discrete dynamics centered around the behavior of logistic maps remain largly unexplored.

For example, while iterations of a single map have been exhaustively studied, less effort has been directed towards addressing what happens (1) when the map itself evolves in time according to a symbolic template and (2) when the maps are organized as nodes in a network, and interact in a time-dependent fashion. We investigate how the traditional theory changes in these cases, illustrating how the hardwired structure (e.g., symbolic template, or respectively adjacency graph) can affect dynamics (behavior of orbits, topology of Julia set, etc.)

This is of potential interest to a variety of applications (including genetic and neural coding), since (1) investigates how an occasional or a reoccurring error in a replication or learning algorithm may affect the outcome and (2) relates to algorithms of synaptic restructuring and neural dynamics in brain networks.