Homework assignment
Infinite Dimensional Dynamical Systems
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http://dynamics.mi.fu-berlin.de/lectures/
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Problem 37:   For permutations $\sigma \in S_N$ define the involution

$$I \ : \ S_N \longrightarrow S_N, \qquad \sigma \longmapsto \sigma^{-1}.$$

 (i) Show that $I\sigma$ is a Sturm permutation if, and only if, σ is a Sturm permutation.

 (ii) Show that the connection graphs associated to the Sturm permutations σ and $I\sigma$ are isomorphic.

Problem 38:   Determine the Sturm permutation of the "other" bi-polar orientation of the plane tetrahedron, **not** discussed in class. Check the resulting Morse indices for consistency.

Extra credit: Actually verify that the resulting connection graph is the quadrangulation of the prescribed plane tetrahedron.

Problem 39:   Starting from their plane 1-skeletons, determine all connection graphs of 2-dimensional Sturm attractors with at most 7 equilibria. Compare your permutations with the list discussed in class.

Problem 40:   Let $G = \mathcal{C}_f^1$ be the 1-skeleton of a plane connection graph with dim $\mathcal{A}_f = 2$. Let v be any vertex of G, alias any attracting hyperbolic equilibrium of $\mathcal{A}_f$. Given any bi-polar orientation of G.

Along a small circle around v, show that we first pass all edges oriented towards v and then any edges oriented away from v.