Math 7H   Professor: Padraic Bartlett

Homework 3: Discrete Dynamical Systems and the Internet

Due Tuesday, Week 4, at the start of class   *UCSB 2015*

Work on these problems for 90m/until you solve everything/longer if you're interested!

1. Consider the following "miniature" model for the internet, made of six webpages[1]:

   - Pets.com: links to boo, Webvan, and Kozmo.
   - boo.com: links to Webvan, Kozmo and eToys.
   - Webvan.com: links to Kozmo, eToys, and DigiScents.

   - Kozmo.com: links to eToys, DigiScents, and Pets.com.
   - eToys.com: links to DigiScents, Pets, and boo.
   - DigiScents.com: links to Pets, boo, and Webvan.

   (a) Draw a diagram with six bubbles, one for each webpage, and arrows between these bubbles representing the links above.

   (b) Turn this model of the internet into a 6×6 "link-matrix" A, as done in the notes.

   (c) Use this link matrix to find the "importance vector" (i.e. eigenvector corresponding to the eigenvalue 1) for this matrix A, showing your work and justifying your answer. Interpret your results: what do they say about the relative importance of these six websites?

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[1] These were all real websites, once upon a time. Even DigiScents. People once thought smelling things over the internet was a good idea.