

Assignment 6

- Axler 10.20, 10.22
- Let T_n be the transitive complete digraph on n vertices. This is the digraph formed by taking n vertices and numbering them from 1 up to n , and adding an arc between every pair of vertices oriented from the smaller vertex to the larger vertex. For example, here is T_3 .

Calculate the eigenvalues and eigenvectors of T_n .

- Let G be an undirected graph with the following properties: r -regular; adjacent vertices do not have a common neighbor (that is, no 3-cycles); every pair of nonadjacent vertices have exactly 3 common neighbors.
 - (a) Explain why we get the matrix equation $3A + A^2 - (r - 3)I = 3J$.
 - (b) Explain why G must have at least $1 + r + r(r - 1)/3$ vertices.
 - (c) Show that if G has exactly the minimum number of vertices given in (b), then $r = 3$.
 - (d) Draw G as found in (c).

Due: Friday October 16