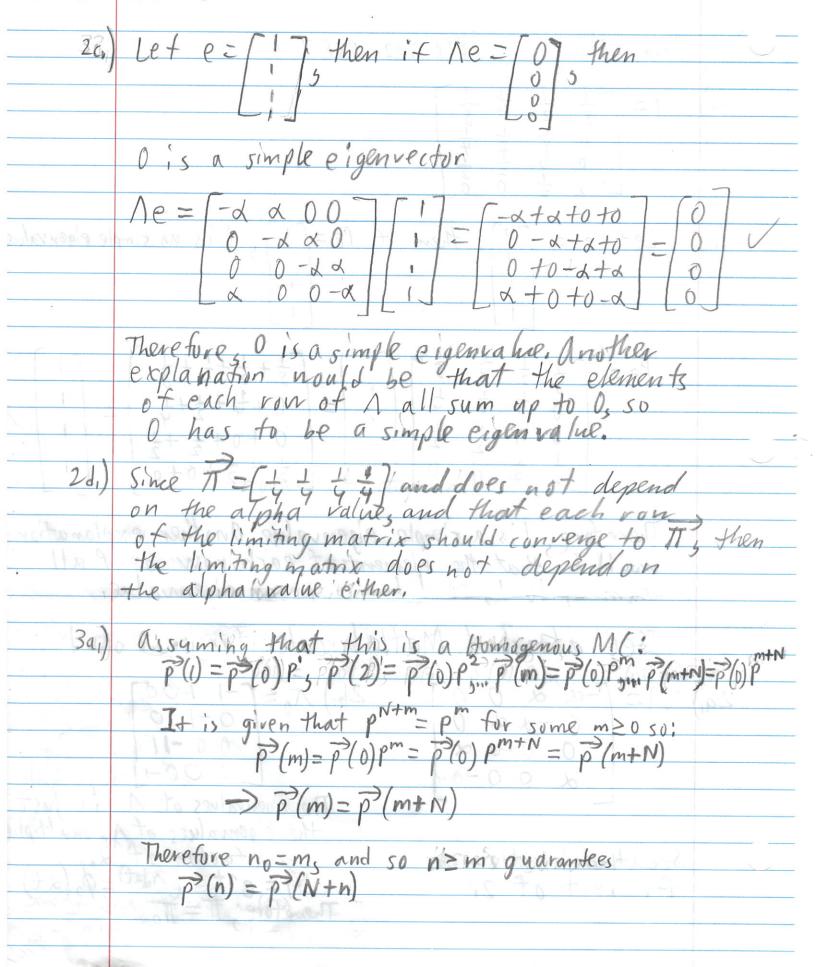
Danny Hong ELEYOZ PSET 5 then if Pe=/ 1) l'is an simple eigenvalue There fore lis a simple eigenvalue. another explanation would be that the elements of each row of Pall sum up to 1, so I has to be an eigenvalue, See attached Matlab code For rest of 291 12 -d d 0 - 0 -d X d 0 0 -d The eigenvalues of 1 is just the eigenvalues of 1 multiplied See attacked mattab code by a factor of 2 b(t) = ent = endat) = po(at) for rest of 2. Therefore to #= 110



Let Phave KXK for some positive integer k. Then since P is a probability matrix, for each row of P: Z Pij = 1, where i = row # and j = column # Since P'is a probability matrix, then for any real value of no P's is a probability matrix as well, Let Q= \(\(\right(P+P)\) = \(\right(P)\) + \(\right(P)\) + \(\right(P)\) Then: $N = \frac{1}{N} =$ Therefores each row of Qumustadd up to 1, and so Q is a probability matrix that Since P (notk) is a probability vectory where 15k & Ny the sum of all its elements will add up to I. as a result; & p(noth) will result in a vector whose selements add up to N (based on a similar reasoning used in part b). Taking the average by multiplying this vector by to will result in the sum of all the elements of the resulting vector to be I (also based ton a similar reasoning used intoport b). Since the vector is 1, this is a valid probability vector, of the one - wrings vector is to The or a probability willow.

$$\frac{1}{N}\sum_{k=1}^{N}\overline{p}(0)\overline{p}^{n_0+k}$$

$$=\frac{1}{N}\sum_{k=1}^{N}\overline{p}(0)\overline{p}^{n_0}\overline{p}^{k}$$

$$=\frac{1}{N}\sum_{k=1}^{N}\overline{p}(0)\overline{p}^{n_0}\overline{p}^{k}$$

$$=\overline{p}(0)\overline{p}^{n_0}(\frac{1}{N})(\frac{N}{2}\overline{p}^{k})$$

$$=\overline{p}(0)\overline{p}^{n_0}(\frac{1}{N})(\frac{N}{2}\overline{p}^{k})$$

$$=\overline{p}(0)\overline{p}^{n_0}Q$$

$$=\overline{p}(0)\overline{q}$$

See Matlab code for 3d.