Alternative Methods for cheeking controllability

1) Eigen Vector Method.

Basically in this method we are checking if each EIGEN VECTORS!! Controllable or not

n = An + Bu

so here we will find a transformation matrix so that it converts it into unique dinunsions like

 $P^{-1}AP = \begin{bmatrix} A_1 & 0 & 0 & 0 & 0 & 0 \\ 0 & A_2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & A_n \end{bmatrix}$

so the whole equation is modified as

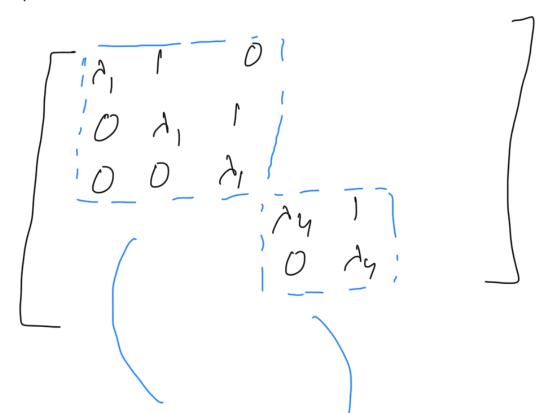
2 = P-1APn + P-1BU

Now if an entire row of the matrix P-1 B is zero then you would be able to completely control their Hence if the system has unique eigen vectors and the P-1 B mortrix does not have any row zero, then the system is controllable.

But what happens if the system doe not have distinct eigen vectors?!

so what you do is that

1) Pick up chunks of matrices when the eigen vector values are not same in the p-1AP matrix.



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You consider them as one distinct value and then treat the assumption

so now we assume that

S-IAS = J (above matrix)

z = s-1Asz + S-1B w and the conditions come out to be that

- 1) no two same jordan blocks should be associated with the same eigen vector (obv:))
- 2) the elements which correspond to the last row in s-1B to a jordan block should not be all zero

3) elements of each row corresponding to each distinct Fordan block should not be zero &.