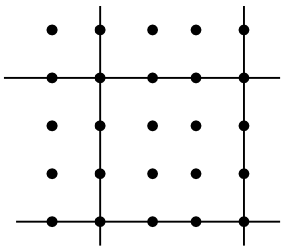
The Given's Method PhL 12.7.04

I got this wrong in my Scheid notes, so let's try it again. Suppose we have this 5x5 orthog matrix

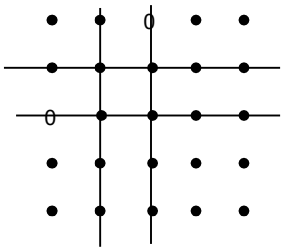
$$\begin{bmatrix} 1 & & & & \\ & C & & & S \\ & & 1 & & \\ & & & 1 & \\ & -S & & & C \end{bmatrix}$$

If you do Q^{-1} A Q around some A, you find out that the following elements of A get "messed up",

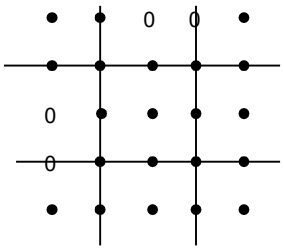


Only the elements with the lines drawn through them get changed by the similarity. When you first do AQ, you find that two columns are messed up (the ones with vertical lines), but all other elements stay the same. When you then apply Q^{-1} , that messes up two rows of AQ, leaving the other rows of AQ as they were. The result is that the elements of A where there is no line stay as they were.

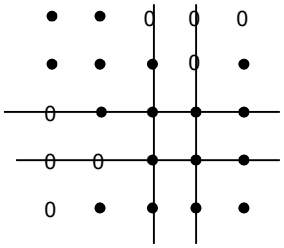
Now let's follow Scheid's proposed sequence on page 353. We start with the 23 rotation and clear out the elements shown:



Next, we do the 24 rotation to get



Notice that the former two zeros are still there. Continue one more to clear out the entire rest of the top row and the first column. Then start over this time with the 34 rotation:



The claim is that those 4 zeros that were there stay there, despite the fact they are on the lines of messing up. Why is this? It must be because there are zeros in BOTH columns, but I would have to do some work to show this fact that previous zeros stay put. In any event, assuming we can show that, then we end up with tridiagonal form.