Mathematics Homework Sheet 9

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Problem 1

From the given hint i observe that the columns of the matrix is just the images of the standard basis vectors. And since e_2 and e_3 are in the kernel, second and third columns of D are all zeros.

$$D = \begin{pmatrix} x & 0 & 0 & x \\ x & 0 & 0 & x \\ x & 0 & 0 & x \\ x & 0 & 0 & x \end{pmatrix}$$

And also from the hint i observe that the image is just span of the column vectors of the matrix. So i will just plug the given vectors in the image of D into the columns of D

$$D = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \end{pmatrix}$$