

Quiz 7 - sol's

1) (a) no, $L[0] = \sum_1^2 1 = -1 \neq 0$

(b) yes

(c) yes

(d) yes

(e) no : $L[-f] = L[f] \neq -L[f]$ in general

(f) no : $L[0] = 2x \neq 0$

2) a) yes, rotate by $-\pi$

b) no, cannot recover y

c) yes, $\dots = (x_5, x_1, x_2, x_3, x_4)$

d) yes, $L[f] = e^{-x} f(x)$

e) no, $\mathbb{R}^m \rightarrow \mathbb{R}^n$ inv'se only if $m=n$

f) yes, $L^{-1}(A) = A B^{-1}$

3) a) $\begin{pmatrix} 1 & 2 \\ 0 & 0 \end{pmatrix}$, b) $S = \begin{pmatrix} -2 & 1 \\ -1 & 0 \end{pmatrix}$, $S^{-1} = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix}$

$$S^{-1} A S = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} 0 & 2 \\ 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 0 & 1 \end{pmatrix}$$

c) project on second component, \dots

d) no, $\det(S^{-1} A S) = \det A = 0$