March 8, 2005 Lecturer Dmitri Zaitsev Hilary Term 2005

Course 2E1 2004-05 (SF Engineers & MSISS & MEMS)

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Due: in the tutorial sessions first Wednesday/Thursday in the next term

Exercise 1

Find bases and dimensions for the row and the column space of the matrix:

(i) $\begin{pmatrix} 5 & -1 \end{pmatrix}$;

(ii) $\begin{pmatrix} 5 \\ -1 \end{pmatrix}$;

(iii) $\begin{pmatrix} -1 & 2 \\ 1 & -2 \end{pmatrix}$;

(iv) $\begin{pmatrix} -1 & 2 & 0 \\ 1 & -2 & 1 \end{pmatrix}$;

(v) $\begin{pmatrix} -1 & 2 \\ 1 & -2 \\ 1 & 0 \end{pmatrix}$;

Exercise 2

Find the rank and the nullity of the matrices in Exercise 1.

Exercise 3

Find a subset of the vectors that forms a basis for the subpace spanned by the vectors:

(i) $(1, 0)$, $(-1, 0)$, $(1, 1)$;

(ii) $(1, 0, 2)$, $(-1, 1, 3)$, $(0, 1, 5)$;

(iii) $(1, 0, 2, -1)$, $(-1, 1, 3, 0)$, $(0, 1, 5, -1)$;

(iv) $(1, 0, 2, -1, 3)$, $(-1, 1, 3, 0, 0)$, $(0, 1, 5, -1, 1)$;