

## HOMEWORK 1

**Problem 1:** Given the  $n \times 4$  matrix  $A = [\vec{v}_1, \vec{v}_2, \vec{v}_3, \vec{v}_4]$ , write the matrix

$$[\vec{v}_1, \vec{v}_1 + 2\vec{v}_2, 3\vec{v}_2 + \vec{v}_3 + \vec{v}_4, \vec{v}_2 + \vec{v}_4]$$

as a product of some matrix  $B$  with the matrix  $A$ . (Pay attention to the order of the product!)

**Problem 2:** Find a  $3 \times 3$  matrix  $E$  so that the product of  $E$  with the matrix

$$\begin{bmatrix} \vec{r}_1^T \\ \vec{r}_2^T \\ \vec{r}_3^T \end{bmatrix}$$

yields the matrix

$$\begin{bmatrix} \vec{r}_1^T + 2\vec{r}_2^T \\ \vec{r}_1^T + \vec{r}_2^T + \vec{r}_3^T \\ \vec{r}_2^T + \vec{r}_3^T \end{bmatrix}$$

(Again, pay attention to the order of the product!)

**Problem 3:** find all the solutions of the complex system

$$(2 + i)z + (3 - i)w = 1, (3 + i)z - 2(2 - i)w = 2.$$

Please also work problems 35, 40, 41, 50 and 51 in Section 1.4 in 'Linear Algebra and its Applications'.

**Please turn it in for grading on Thursday January 16 .**