Philadelphia University

Department of Basic Sciences

Exam 2 **Linear Algebra** **24–04–2013**

1. Find the eigenvalues and eigenvectors for the matrix A.

$$A = \begin{bmatrix} 1 & 3 \\ 4 & 2 \end{bmatrix}$$

2. Is the set of vectors linearly dependent or independent? Why?

$$\{(1,2,0,0),(2,3,2,0),(4,5,6,0),(1,0,3,2)\}$$

3. Assume the change of basis from the old basis $\{(1,0),(0,1)\}$ to the new basis $\{(4,1),(-7,-2)\}$. Given the old coordinates $(3,1)$, find the new coordinates.

4. Change the basis to an orthonormal basis using Gram-Schmidt process.

$$\{(0,3,0),(1,1,1),(2,1,0)\}$$

   Hint: the formula for $u_3 := u_3 - (u_3 \cdot v_1)v_1 - (u_3 \cdot v_2)v_2$

–Amin Witno