Final Exam

Linear Algebra, Dave Bayer, May 11, 2004

Name: _____

[**1**] (5 pts)	[**2**] (5 pts)	[**3**] (6 pts)	[**4**] (6 pts)	[**5**] (6 pts)	[**6**] (6 pts)	[**7**] (6 pts)	**TOTAL**

Please work only one problem per page, starting with the pages provided, and identify all continuations clearly.

[1] Find an orthogonal basis for the subspace V of $\mathbb{R}^4$ spanned by the vectors $(1,0,0,1)$, $(0,1,0,1)$, $(0,0,1,1)$.

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answer:

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work:

[2] By least squares, find the equation of the form $y = ax + b$ which best fits the data $(x_1, y_1) = (-1, 0)$, $(x_2, y_2) = (0, 0)$, $(x_3, y_3) = (1, 1)$, $(x_4, y_4) = (2, 0)$.

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answer:

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work:

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[3] Find (s,t) so $\begin{bmatrix} 1 & 0 \\ 0 & 1 \\ 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} s \\ t \end{bmatrix}$ is as close as possible to $\begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}$.

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answer:

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work:

[4] Let $A = \begin{bmatrix} 3 & 1 \\ 1 & 3 \end{bmatrix}$. Write A as CDC^{-1} for a diagonal matrix D.

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answer:

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work:

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[5] Let $A = \begin{bmatrix} 2 & 1 & -2 \\ 2 & 1 & -2 \\ 3 & 1 & -3 \end{bmatrix}$. Write A as CDC^{-1} for a diagonal matrix D.

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answer:

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work:

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[6] Let $A = \begin{bmatrix} -2 & 1 \\ -1 & 0 \end{bmatrix}$. Find the matrix exponential e^{At}.

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answer:

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work:

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[7] Let $A = \begin{bmatrix} 2 & 1 & -1 \\ -1 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$. Find the matrix exponential e^{At}.

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answer:

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work:

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Problem: _____

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Problem: _____

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