EE2100: Matrix Theory

Quiz - 4

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1. (3 points) Compute the value if x such that $\mathbf{Det}(\mathbf{A}) = c$ where $\mathbf{A} = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & x \\ 2 & 3 & 4 \end{bmatrix}$

2. (3 points) Let x be such that $\mathbf{Det}(\mathbf{A}) = c$ where $\mathbf{A} = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & 5 & x \end{bmatrix}$. Compute the determinant of matrix $\mathbf{B}$ given by $\mathbf{B} = \begin{bmatrix} 2 & 4 & 6 \\ 8 & 13 & 18 \\ 4 & 5 & x \end{bmatrix}$

3. (3 points) Let x and y be such that the maximum eigen value of $\mathbf{A} = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 4 & y & x \end{bmatrix}$ is c. Compute the maximum eigen value of matrix $\mathbf{B}$ given by $\mathbf{B} = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 1 & 4 \\ 4 & y & x-2 \end{bmatrix}$.

4. (3 points) Let $\mathbf{A} \in \mathcal{R}^{3\times 3}$ and $\mathbf{B} \in \mathcal{R}^{3\times 3}$ be full rank matrices such that the eigen values of $\mathbf{AB}$ are $1, 2$ and 3. If $\mathbf{Tr}(\mathbf{B}^T\mathbf{B}) = c$ and $\mathbf{Tr}(\mathbf{A}^T\mathbf{A}) = \frac{14}{c}$, the minimum eigen value of $\mathbf{BA}$ is

5. (3 points) Let $\mathbf{A}^{3\times 3}$ be a skew symmetric matrix whose eigen values are 0, $-cj$. The imaginary part of the other eigen value of $\mathbf{A}$ is