**Lecture 3**

1. Matrices are given $A=\left(\begin{matrix}3&-1\\5&2\end{matrix}\right)$ a $B=\left(\begin{matrix}1&0\\-4&3\end{matrix}\right)$. Calculate:

a) $2A+3B$

b) $A^{T}+3B^{T}$

c) $A∙B$

2. Matrices are given $C=\left(\begin{matrix}1&4&-2\\-1&1&3\\0&2&2\end{matrix}\right)$ a $D=\left(\begin{matrix}0&3&-2\\-1&5&-1\\1&3&2\end{matrix}\right)$. Calculate:

a) $C∙D$

b) $D∙C$

3. Compute the product of matrices $F=\left(\begin{matrix}1&-2&6\\3&-5&0\end{matrix}\right)$ a $G=\left(\begin{matrix}4&-1&6\\9&-5&7\end{matrix}\right)$.

4. Determine the rank of the following matrices and decide which are regular (non-singular) and which are singular.

a) $A=\left(\begin{matrix}2&5\\1&1\end{matrix}\right)$ b) $B=\left(\begin{matrix}5&5\\1&1\end{matrix}\right)$

c) $C=\left(\begin{matrix}1&7&5\\2&4&0\end{matrix}\right)$ d) $D=\left(\begin{matrix}1&2&4\\0&3&1\\1&5&5\end{matrix}\right)$

5. Calculate inversion matrices for following matrices:

a) $A=\left(\begin{matrix}1&2\\3&4\end{matrix}\right)$

b) $B=\left(\begin{matrix}1&0\\-4&3\end{matrix}\right)$

c) $C=\left(\begin{matrix}2&1\\4&2\end{matrix}\right)$

6. Solve the matrix equations, where $A=\left(\begin{matrix}2&2\\-3&5\end{matrix}\right)$, $B=\left(\begin{matrix}7&4\\-4&1\end{matrix}\right)$, $C=\left(\begin{matrix}0&1\\3&5\end{matrix}\right)$.

a) $2A-X=B-C$

b) $AX=3B$

c) $XA^{T}=2C+XB^{T}$