Diagonal, Triangular and Symmetric Matrices/

A general nxn diagonal matrix Diagonal

A diagonal matrix is invertible iff all of its diagonal

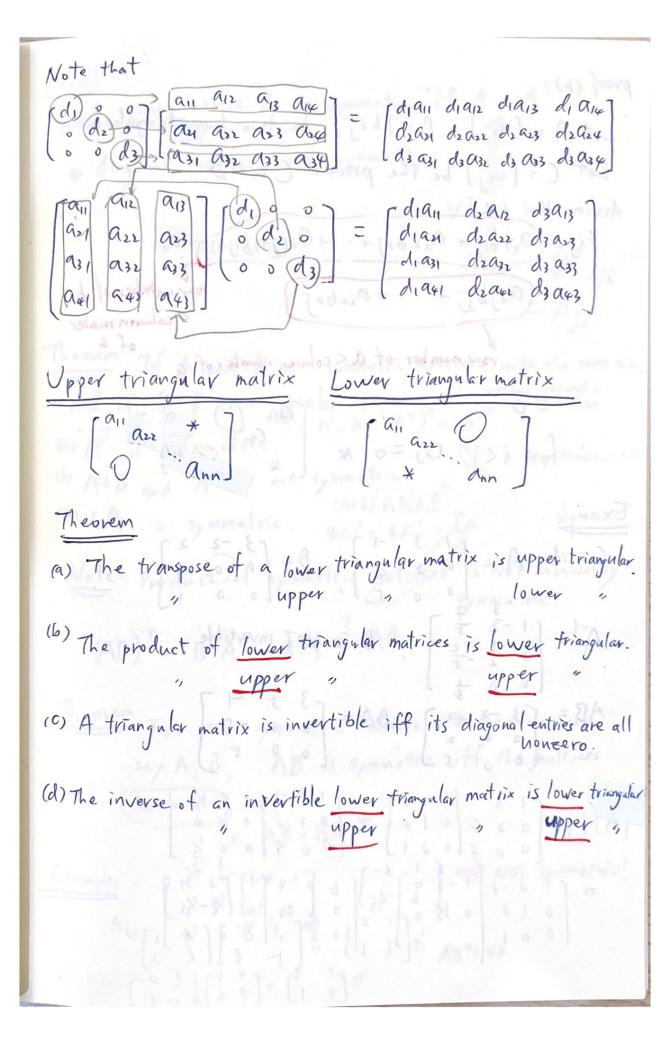
$$D' = \begin{bmatrix} 1/a_1 & 0 \\ 0 & 1/a_2 \end{bmatrix}$$

$$DD^{\dagger} = D^{\dagger}D = I_n$$

Also,
$$D^{k} = \begin{bmatrix} d^{k} & 0 \\ 0 & d^{k} \end{bmatrix}$$

then
$$A' = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -\frac{1}{3} & 0 \\ 0 & 0 & \frac{1}{2} \end{bmatrix}$$
, $A' = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -243 & 0 \\ 0 & 0 & 32 \end{bmatrix}$

$$A^{-5} = (A^{5})^{-1} = A^{-1})^{5} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -\frac{1}{243} & 0 \\ 0 & 0 & \frac{3}{23} \end{bmatrix}$$



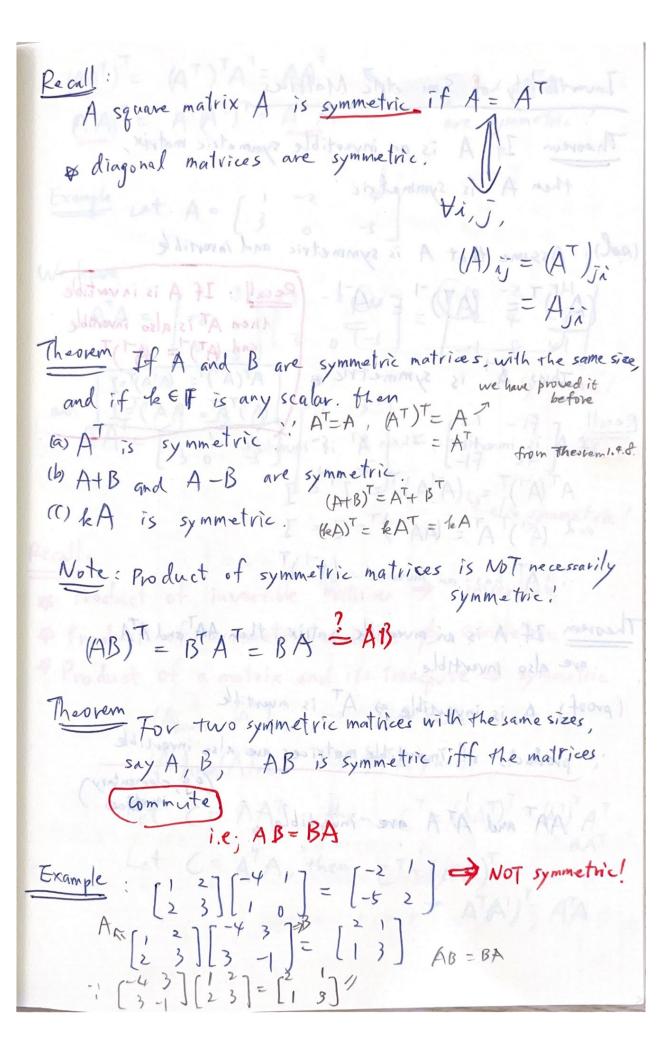
proof (b):

Let
$$A = [aij]$$
, $B = [bij]$ be two lower triangular nating

Let $C = [caj]$ be the product $C = AB$

Assume that $a \neq j$:

 $cij = [aij] + [aiz bzj + ... + [ai(j+1)b(j+1)]]$
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Invertibility of Symmetric Matrices Theorem If A is an invertible symmetric matrix, then A is symmetric (Rol): Assume that A is symmetric and invertible (A) T = (AT) = AT | Recall: If A is invertible then AT is also invertible and (AT) = (AT) T Thus AT is symmetric & (AT) T = (ATA) T = I (A) TAT = (ATA) T = I (A) TAT = (ATA) T = I Recall: If A is invertible, then AT is invertible?! AT(AT)T = (ATA)T = ITS 7 and (A')TAT = (AAI)T=I= I silomove in AAI AT has an inverse : (A-1) To to both any story Theorem If A is an invertible matrix, then AAT and ATA are also invertible (proof): A is invertible > AT is invertible products of invertible matrices are also invertible (e.g., elementary) : AAT and ATA are invertible & Dintammy Toli &