240AlgebraI-091203, Hour 36: Diagonalization

November-26-09
9:43 AM

~~Make a handout~~ & key.

1. Write $\begin{pmatrix}\text{specific}\\ \text{matrix}\\ \vdots\end{pmatrix}$ in terms of $(\ ),(\ )$

(specific basis) result: $\begin{pmatrix}2&0\\0&-1\end{pmatrix}$ $\begin{pmatrix}1&2\\3&4\end{pmatrix}^{-1}\begin{pmatrix}2&0\\0&-1\end{pmatrix}\begin{pmatrix}1&2\\3&4\end{pmatrix}$

$=($

2. The general change-of-basis theory.

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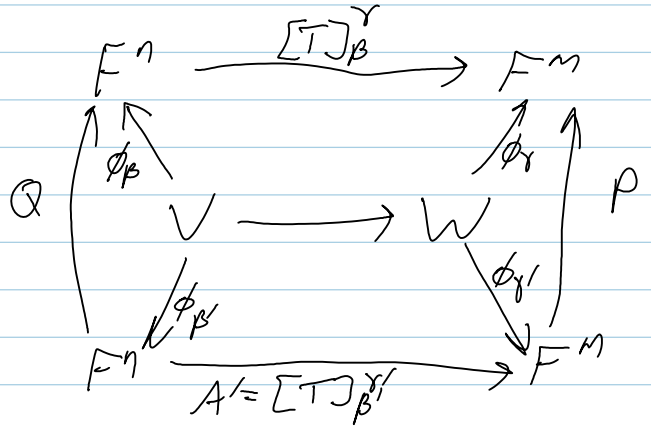
* Go over "on the Final exam" handout.

Problem Let V & W be f.d. V.S., let $\beta=(u_1 \dots u_n)$ and $\beta'=(u_1' \dots u_n')$ be bases of V, let $\gamma=(w_1 \dots w_m)$ and $\gamma'=(w_1' \dots w_m')$ be bases of W, let $T: V \to W$ be l.t. and let $A=[T]_\beta^\gamma \in M_{m\times n}(F)$. What is $A'=[T]_{\beta'}^{\gamma'}$?

Sol'n



$A'=P^{-1}AQ$ where $Q=[I_V]_{\beta'}^{\beta}$ and $P=[I_W]_{\gamma'}^{\gamma}$

Example $T: F^2 \to F^2$ is given by $\begin{pmatrix}-7&3\\-18&8\end{pmatrix}$

What is $[T]_D^D$, where $D=\left\{\begin{pmatrix}1\\3\end{pmatrix},\begin{pmatrix}2\\4\end{pmatrix}\right\}$?

D^{-1}

Aside

$$P = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \quad P^{-1} = \begin{pmatrix} -2 & 1 \\ 3/2 & -1/2 \end{pmatrix} \quad D = \begin{pmatrix} 2 & 0 \\ 0 & -1 \end{pmatrix}$$

Good luck with the finals & have a great time in 247 $\begin{matrix} D \\ 0 \end{matrix}$