Math 290 B, Tuesday, April 28 Section MR

Wed- Exam LT

Thu- MR (CB) (Sage)

Fri- Problem Session

Mon- CB (RQ)

Tue- Problem Session

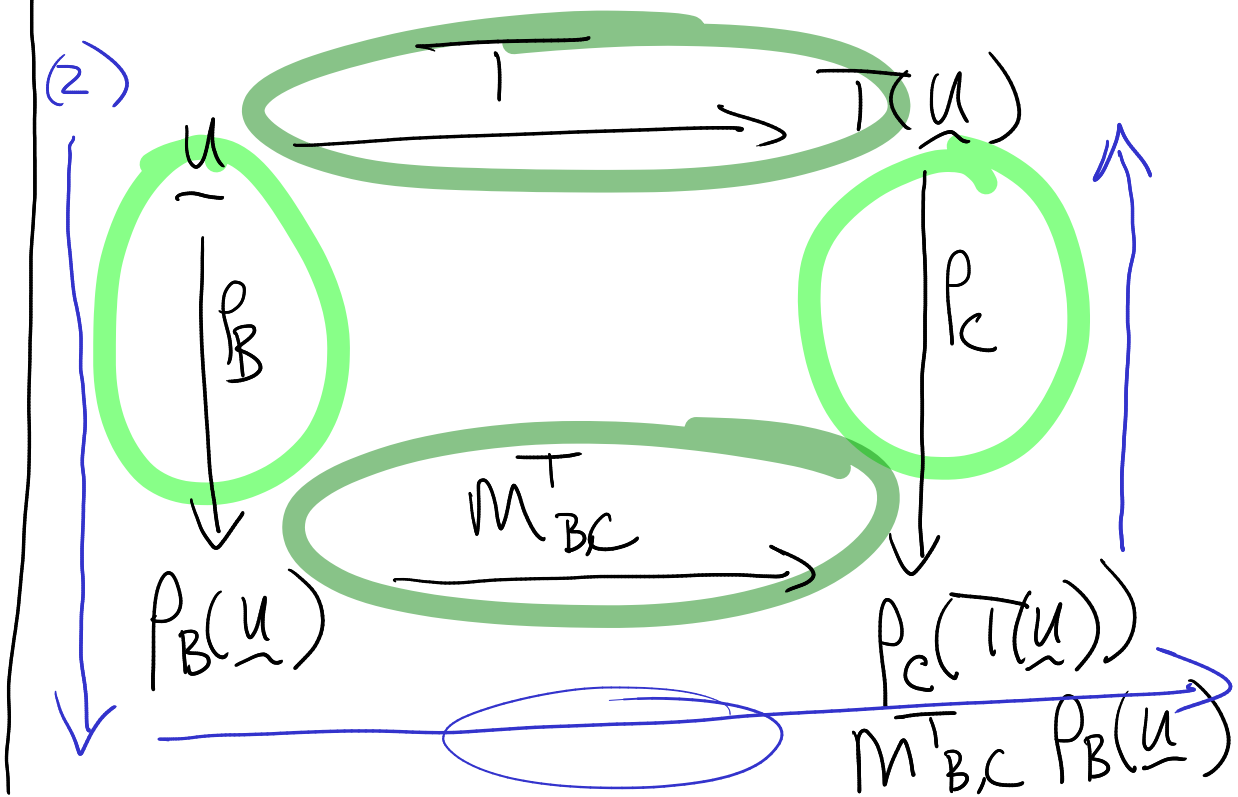
Wed- Exam R

~~OD~~

Theorem FTMR $T: U \to V$, B & C bases, $\underset{\sim}{u} \in U$

1) $\rho_C(T(\underset{\sim}{u})) = M^T_{B,C}\, \rho_B(\underset{\sim}{u})$

2) $T(\underset{\sim}{u}) = \rho_C^{-1}\left(M^T_{B,C}\, \rho_B(\underset{\sim}{u})\right)$



Ex $T: M_{22} \to P_2$ $T\left(\begin{bmatrix} a & b \\ c & d \end{bmatrix}\right) = (2a+b+3c-2d) + (5a+3b+7c-4d)x + (a+b+c)x^2$

$C = \left\{ \begin{bmatrix} 1 & -2 \\ 1 & -1 \end{bmatrix}, \begin{bmatrix} 2 & -3 \\ 3 & 0 \end{bmatrix}, \begin{bmatrix} 1 & -3 \\ 1 & -2 \end{bmatrix}, \begin{bmatrix} 2 & -2 \\ 4 & 3 \end{bmatrix} \right\}$ $E = \{1, 1+x, 1+x+x^2\}$: $M^T_{C,E}$?

$\rho_E\left(T\left(\begin{bmatrix} 1 & -2 \\ 1 & -1 \end{bmatrix}\right)\right) = \rho_E(5+10x+0x^2) = \rho_E(-5(1)+10(1+x)+0(1+x+x^2)) = \begin{bmatrix} -5 \\ 10 \\ 0 \end{bmatrix}$

$\rho_E\left(T\left(\begin{bmatrix} 2 & -3 \\ 3 & 0 \end{bmatrix}\right)\right) = \begin{bmatrix} -12 \\ 20 \\ 2 \end{bmatrix}$

$\rho_E\left(T\left(\begin{bmatrix} & \end{bmatrix}\right)\right) = \begin{bmatrix} -5 \\ 12 \\ -1 \end{bmatrix}$

$\rho_E\left(T\left(\begin{bmatrix} & \end{bmatrix}\right)\right) = \begin{bmatrix} -12 \\ 16 \\ 4 \end{bmatrix}$

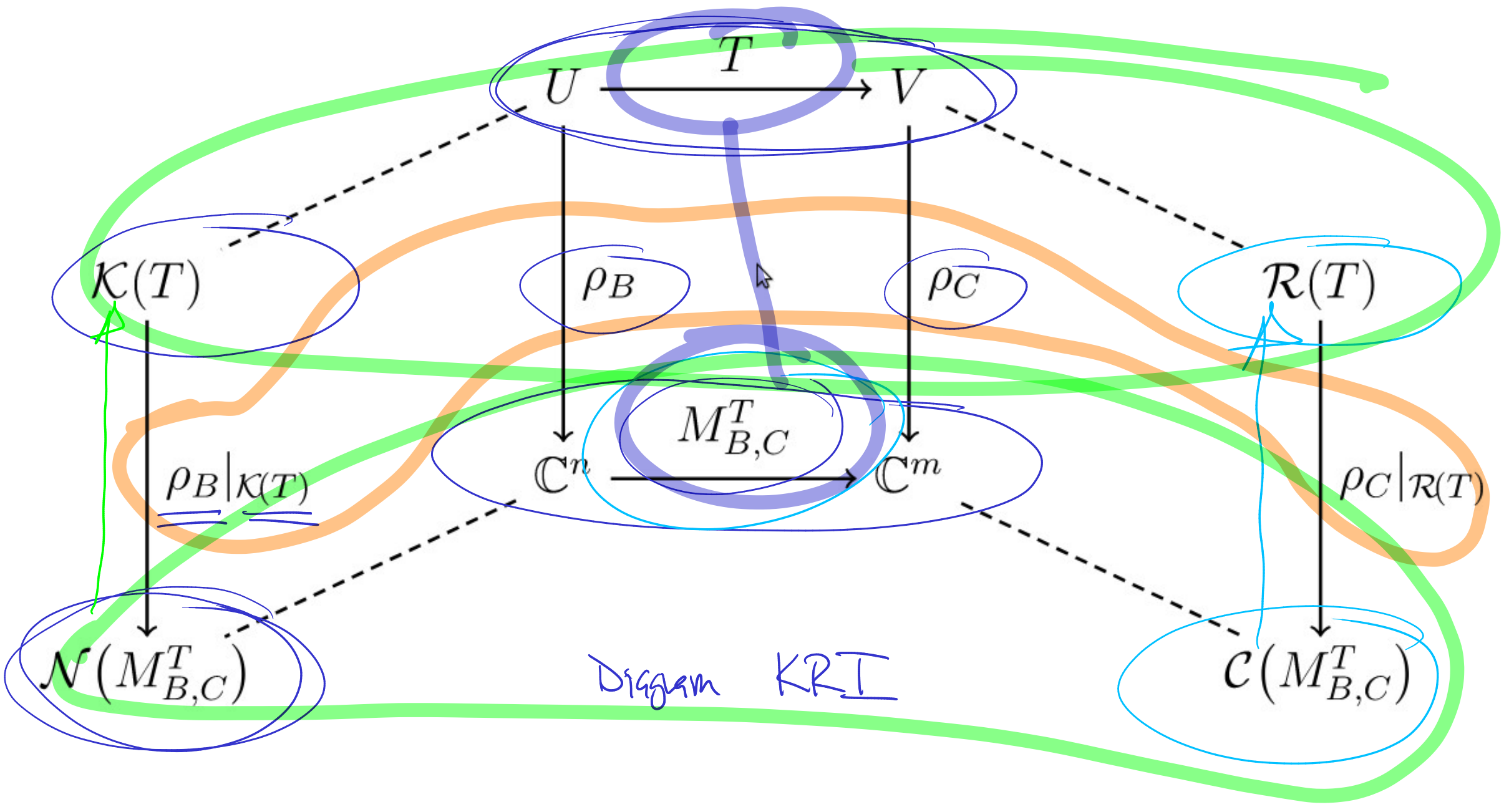
$$M^T_{C,E} = \begin{bmatrix} -5 & -12 & -5 & -12 \\ 10 & 20 & 12 & 16 \\ 0 & 2 & -1 & 4 \end{bmatrix}$$

3 x 4

$$T\left(\begin{bmatrix}1&2\\3&4\end{bmatrix}\right) = 5+16x+6x^2$$

$$T\left(\begin{bmatrix}1&2\\3&4\end{bmatrix}\right) \underset{\text{FTMR}}{=} \rho_E^{-1}\left(M_{C,E}^T\,\rho_C\left(\begin{bmatrix}1&2\\3&4\end{bmatrix}\right)\right) = \rho_E^{-1}\left(M_{C,E}^T\begin{bmatrix}-3\\4\\-2\\-1\end{bmatrix}\right) \qquad \begin{matrix}15\\-48\\10\\12\end{matrix} \quad -11$$

$$= \rho_E^{-1}\left(\begin{bmatrix}-11\\10\\6\end{bmatrix}\right) = -11(1)+10(1+x)+6(1+x+x^2) = 5+16x+6x^2$$


U
T
V
$\mathcal{K}(T)$
ρ_B
ρ_C
$\mathcal{R}(T)$
$M_{B,C}^T$
$\mathbb{C}^n$
$\mathbb{C}^m$
$\rho_B|_{\mathcal{K}(T)}$
$\rho_C|_{\mathcal{R}(T)}$
$\mathcal{N}\left(M_{B,C}^T\right)$
$\mathcal{C}\left(M_{B,C}^T\right)$
Diagram KRI