

Math 390

Monday, February 15

Pre-Exam Review

MR.T&O

Exam Tuesday Nite

- Laptop, wifi, battery

- Sage Cell

Code - 4 characters

Format - 3 pages

Know L.T., matrix representations

Defn MR

$$M_{B,C}^T = [p_c(T(\underline{u}_1)) \mid p_c(T(\underline{u}_2)) \mid \dots \mid p_c(T(\underline{u}_n))]$$

$$B = \{\underline{u}_1, \dots, \underline{u}_n\}, C = \{\underline{v}_1, \dots, \underline{v}_n\}, D = \{\underline{w}_1, \dots, \underline{w}_p\}$$

$$T: U \rightarrow V, S: V \rightarrow W. M_{B,D}^{S \circ T} ???$$

$$M_{B,C}^T = (m_{ij}) \quad M_{C,D}^S = (n_{ij})$$

$$\left[M_{B,D}^{S \circ T} \right]_{ij} = \left[p_D(S(T(\underline{u}_j))) \right]_i$$

$$= \left[p_D(S(\underline{u}_j)) \right]_i$$

$$= \left[p_D\left(S\left(\sum_{k=1}^n m_{kj} \underline{v}_k\right)\right) \right]_i$$

row i
of col j

$$= \left[P_D \left(\sum_{k=1}^n m_{kj} S(\underline{v}_k) \right) \right]_i \quad S \text{ is a LT}$$

$$= \left[P_D \left(\sum_{k=1}^n m_{kj} \sum_{\ell=1}^p n_{\ell k} \underline{w}_\ell \right) \right]$$

$$= \left[P_D \left(\sum_{\ell=1}^p \left(\sum_{k=1}^n n_{\ell k} m_{kj} \right) \underline{w}_\ell \right) \right]_i$$

in combo of D

$$= \sum_{k=1}^n n_{ik} m_{kj}$$

Theorem EMP

"Discover matrix multiplication"

Scalars in a linear combo of D. Indexed by i .
Component of vector representation relative to D

Theorem

$$\mathbb{C}^n = G_A(\lambda_1) \oplus G_A(\lambda_2) \oplus \dots \oplus G_A(\lambda_k)$$

→ invariant

Theorem GEB