

LECTURE 8

Review Session

0.1. Vectors in \mathbb{R}^n .

0.1.1. *Vector Addition.*

0.1.2. *Scalar Multiplication.*

0.1.3. *Linear Combinations of Vectors.*

0.1.4. *Dot Products.*

0.2. Geometry of Vector Spaces.

0.2.1. *Lines, Planes and Hyperplanes.*

0.2.2. *Cauchy-Schwartz Inequality:* $|\mathbf{u} \cdot \mathbf{v}| \leq \|\mathbf{u}\| \|\mathbf{v}\|$.

0.2.3. *Triangle Inequality:* $\|\mathbf{u} + \mathbf{v}\| \leq \|\mathbf{u}\| + \|\mathbf{v}\|$.

0.3. Matrices and Matrix Algebra.

0.3.1. *Matrices and Linear Systems : Augmented Matrices.*

0.3.2. *Matrix Multiplication.*

0.3.3. *Matrix Addition.*

0.3.4. *The Transpose of a Matrix.*

0.4. Systems of Linear Equations.

0.4.1. *The Geometry of Linear Systems and Nature of Solution Spaces.*

0.4.2. *Elementary Row Operations.*

0.4.3. *Row-Echelon Form.*

0.4.4. *Reduced Row-Echelon Form.*

0.4.5. *Solving Linear Equations.*

0.4.6. *Elementary Matrices.*

0.5. Inverses of Square Matrices.

0.5.1. *Properties of Matrix Inverses.*

0.6. Subspaces and Bases.