## Group Debrief 3

Learning Goal 1: investigate linear transformations of the plane and 3 -space

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.
Each group member takes a turn for each learning outcome. Try to help each other as material in this class builds upon itself.


Image 1 created using VLA Package from Visual Linear Algebra by Herman and Pepe
Adapted from model by Kecskemeti B. Zoltan, courtesy of Lucasfilm LTD, Using the Force of Math in Star Wars:-

Learning Goal 2: connect linear transformations to matrix-vector products and matrix multiplication

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.
Each group member takes a turn for each learning outcome.
Try to help each other as material in this class builds upon itself.

https://pbs.twimg.com/media/BhKmT5RIYAA4iU6.jpg:lafge

Learning Goal 3: compute norms (length) and inner products (dot product)

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.
Each group member takes a turn for each learning outcome. Try to help each other as material in this class builds upon itself.


Learning Goal 4: investigate orthogonality

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.
Each group member takes a turn for each learning outcome. Try to help each other as material in this class builds upon itself.


Purr-pendicular

Learning Goal 5: connect linear transformations, norms and orthogonality to computer graphics

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.
Each group member takes a turn for each learning outcome. Try to help each other as material in this class builds upon itself.


Model created by Kecskemeti B. Zoltan, courtesy of Lucasfilm LTD as on Using the Force of Math in Star Wars.

Learning Goal 6: link algebra and geometry of the above, explore applications, and interpret statements

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
3. Prepare to share from your group's discussion with the class.

Each group member takes a turn for each learning outcome. Try to help each other as material in this class builds upon itself.
projection $\left[\begin{array}{lll}1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1\end{array}\right]$


Adapted from model by Kecskemeti B. Zoltan, courtesy of Lucasfilm LTD, Using the Force of Math in Star Wars.

## Module 3 Review and Module 4 Overview

- Linear Transformations and Orthogonality 10/20-11/8
- 1.8 and 1.9: linear transformations as left multiplication of matrices
- 6.1: length \& angle of a vector, orthogonal vectors
- 2.7: computer graphics, including the application of orthogonal vectors, matrix inverses and transposes problem set 3
- Determinants, Eigenvalues and Eigenvectors 11/8-finals
- 3.1, 3.2, 3.3: determinants alg \& geom, invertibility
- 5.1, 5.2: eigenvectors \& eigenvalues alg \& geom, nullspace $(A-\lambda I)$
- 5.6: eigenvector decomposition, limit, trajectory \& populations
problem set 4
in-class assessment 2 final project

