

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.

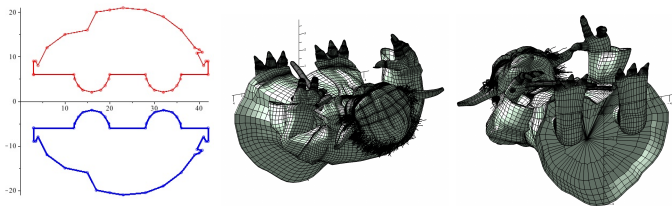


Image 1 created using VLA Package from *Visual Linear Algebra* by Herman and Pepe
Adapted from model by **Kecskemeti B. Zoltan**, courtesy of Lucasfilm LTD, Using the Force of Math in *Star Wars*.



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.

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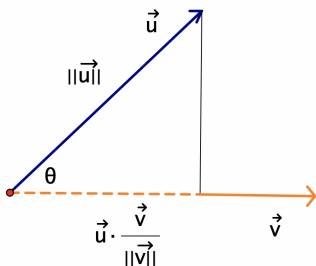


Learning Goal 3: compute norms (length) and inner products (dot product)

1. What are significant take aways of this learning outcome?
2. Also reflect on personal connections, experiences and/or any remaining questions you have.
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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.

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<https://i.redd.it/xu89vcweusc11.jpg>

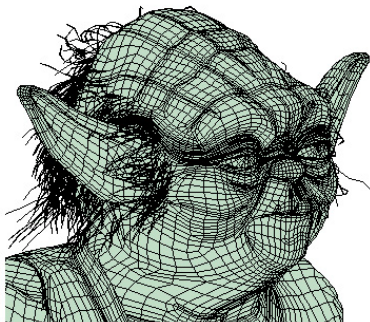
Purr-pendicular

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.

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



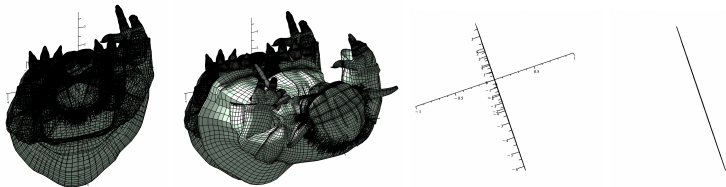
Learning Goal 6: link algebra and geometry of the above, explore applications, and interpret statements

1. What are significant take aways of this learning outcome?
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projection $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$



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
 - 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
 - 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