Welcome to ASEN 3728 Aircraft Dynamics!

ASEN 3728 Aircraft Dynamics
UNIVERSITY OF COLORADO **BOULDER**

Outline

What is A/C Dynamics About?

Course Logistics

Nomenclature

My Background and Research

Aircraft Dynamics and Controls

Aeronautical Engineering

1) Aerodynamics
2) Structures and Materials
3) Propulsion
4) Dynamics and Controls

- Keep the pointy end in front
- Get the aircraft to where we want to go

In this class, we will

- Develop a mathematical model of aircraft (A/C) behavior
- Learn how to create an aircraft computer simulation model
- Design control systems to effect desirable dynamics

Aircraft Dynamics

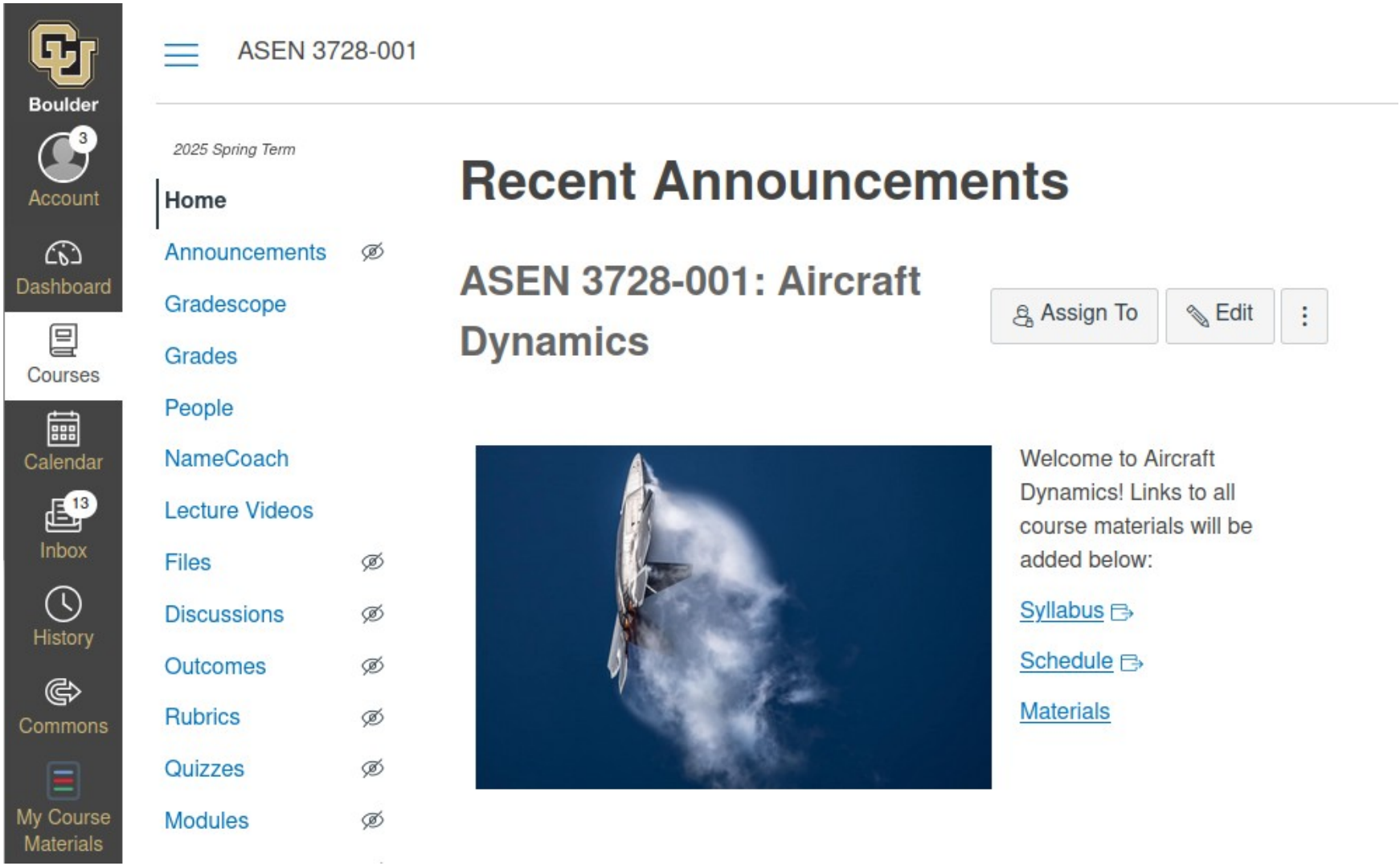
Newton's Laws (ASEN 2703) — *Inertial Reference Frame*

\+ Aerodynamics (ASEN 2702, ASEN 3711) — *Body Reference Frame*

Aircraft Dynamics (ASEN 3728)

Nonlinear Equations of Motion

Course Hub: Canvas



My Assumptions

- The material is challenging, and can take multiple engagements to understand fully
- A student who comes to my office or asks a question wants to learn
- It may take multiple ways of explaining a concept before a student understands
- We must work together to help you find the way to understand
- Taking notes in class and doing the homework yourselves are critical steps to understanding
- I am trying to bring you to the point of understanding, not just give you the answer
- We will have fun this semester


UNLEASH
THE MEMES!
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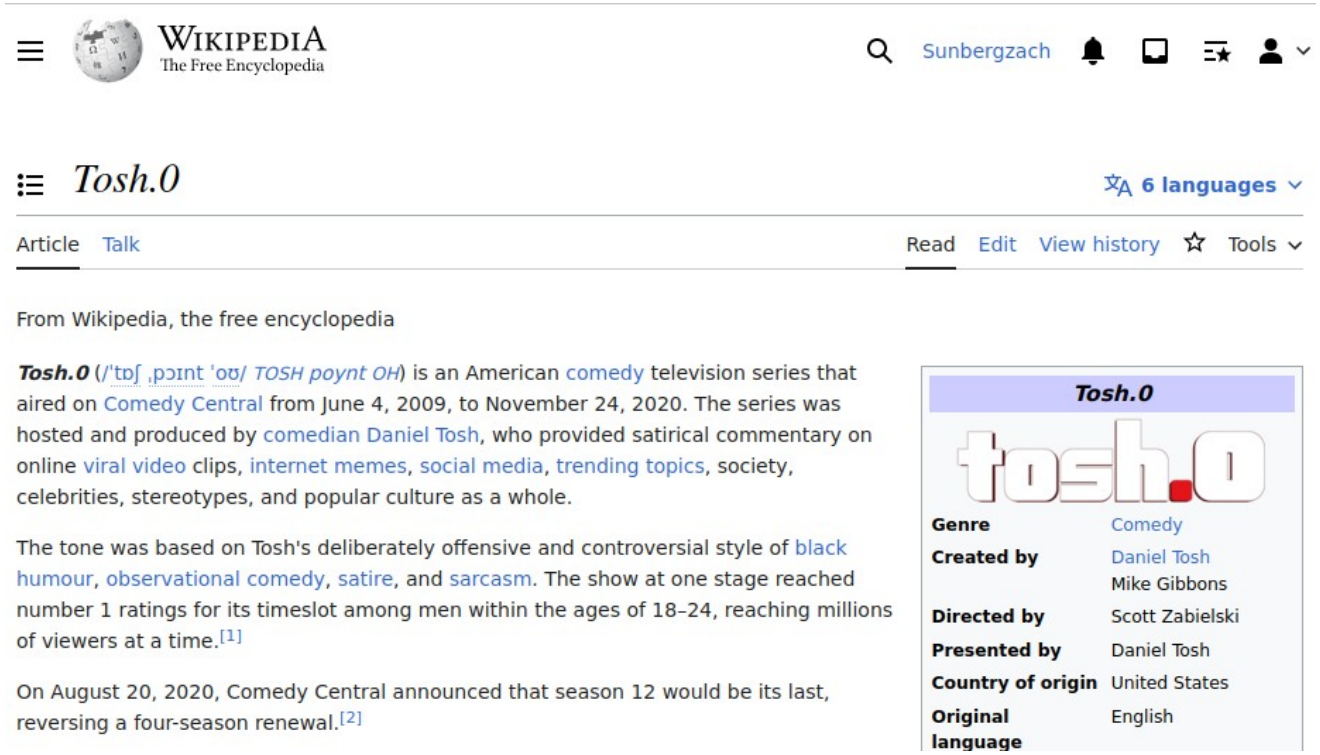

WIKIPEDIA
The Free Encyclopedia

Sunbergzach

Tosh.0

6 languages

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From Wikipedia, the free encyclopedia

Tosh.0 (/ˈtɒʃ ˌpɔɪnt ˈoʊ/ *TOSH poynt OH*) is an American comedy television series that aired on Comedy Central from June 4, 2009, to November 24, 2020. The series was hosted and produced by comedian Daniel Tosh, who provided satirical commentary on online viral video clips, internet memes, social media, trending topics, society, celebrities, stereotypes, and popular culture as a whole.

The tone was based on Tosh's deliberately offensive and controversial style of black humour, observational comedy, satire, and sarcasm. The show at one stage reached number 1 ratings for its timeslot among men within the ages of 18–24, reaching millions of viewers at a time.[1]

On August 20, 2020, Comedy Central announced that season 12 would be its last, reversing a four-season renewal.[2]

Tosh.0	
Genre	Comedy
Created by	Daniel Tosh Mike Gibbons
Directed by	Scott Zabielski
Presented by	Daniel Tosh
Country of origin	United States
Original language	English

Once a week I will feature course-related memes and videos from the Internet.

Students should email me links to memes and videos on **topics related to the course content** (not about the course itself).

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THE UNITED STATES NAVY BLUE ANGELS ARE SUSPENDING OPERATIONS DURING THE CORONAVIRUS CRISIS
U.S.NAVY
BECAUSE THE PILOTS MUST MAINTAIN A DISTANCE OF AT LEAST 6-FEET FROM ONE ANOTHER
DEMONSTRATIONS BY THE U.S. AIR FORCE THUNDERBIRDS WILL NOT BE AFFECTED.
USAF
USAF
USAF

Break

True or False Question

Expect TRUE/FALSE questions as part of the Homework and Exams. In all cases students are expected to provide a concise, correct, logically sound justification for full credit.

True or False Question

$$\mathbf{v}_B^E = \begin{pmatrix} u^E \\ v^E \\ w^E \end{pmatrix} = \begin{pmatrix} 25 \\ 0 \\ -4 \end{pmatrix}$$

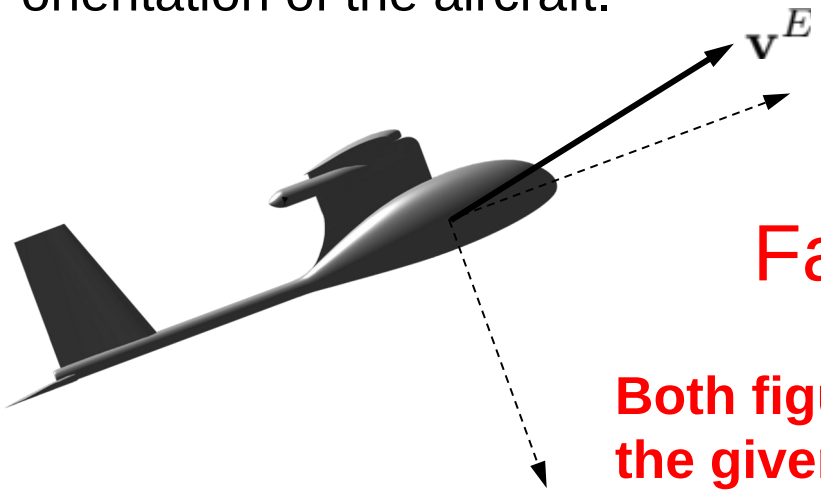
True or False: Given this velocity vector $\mathbf{v}_B^E$ one can conclude that the aircraft is ascending? Justify your answer.

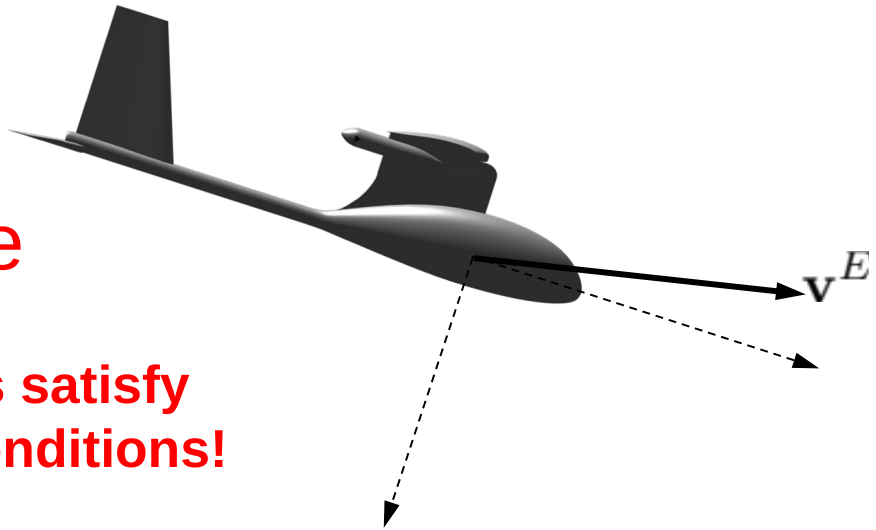
True or False Question

$$\mathbf{v}_B^E = \begin{pmatrix} u^E \\ v^E \\ w^E \end{pmatrix} = \begin{pmatrix} 25 \\ 0 \\ -4 \end{pmatrix}$$

True or False: Given this velocity vector $\mathbf{v}_B^E$ one can conclude that the aircraft is ascending? Justify your answer.

The vector $\mathbf{v}_B^E$ is the inertial velocity expressed in body coordinates. In order to know if the aircraft is ascending you need to know the vector in inertial coordinates. In order to calculate this vector, we need to know the orientation of the aircraft.





False

Both figures satisfy the given conditions!