

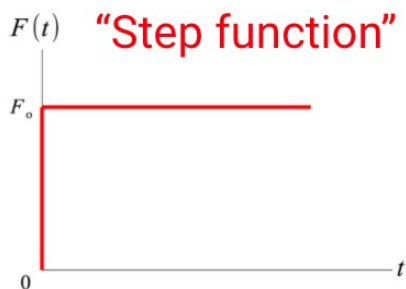
Project 7 [18 FP “Fluency Points”]:

Real-Life Vibration Due to a Step Forcing Function Modeled as an Arbitrary Excitation

Description:

In either a). a written technical memo no more than four pages long or b). a video no longer than 120 seconds:

- Identify or design a 1-DOF forced vibration of an object in or around your house, where the external excitation is a step function that looks like:



- Explain the phenomenon and the vibration behavior by:
 - Conducting a simple experiment to capture the motion of the vibrating structure, and graphing the observed vibration in a displacement vs time plot; and:
 - Performing a theoretical analysis and visualizing the solution in a displacement vs time plot, by using the “arbitrary” nonharmonic excitation theory (with Duhamel integral, etc.)
- Make concluding remarks that may include a comparison of the experimental and analytical results, sources of error, validity of your assumptions, etc.
- Reflect on your learning and journey of working on this project

Deliverable:

Present your work in one of the following formats:

- A four-page (max) technical memorandum (tech memo) written solely by you in Google Docs
- A two-minute (max) video produced solely by you, uploaded to YouTube

Rules and Format:

- If you choose the tech memo option:
 - All rules from Project 6 apply here
- If you choose the video option:
 - All rules from Project 3 apply here

- This is an individual project
- Violation of *any* of these rules will invalidate your submission altogether – read this document carefully (srsly)!

Submission:

Submit your Google Doc link (URL) or your YouTube link (URL) on Gradescope only. Submissions by email or other means will be disregarded.

Due Apr 19, 2021 (Monday) 11:59 pm.

Late submissions will be subject to the “half-life” reduction policy according to the syllabus.

Grading Rubric:

	Fluency			Scaling	Max Possible
	2	1	0		
Experimental Setup & Realism	Example accurately depicts the vibration type; detailed information on how the observed data is collected and plotted	Some obvious details missing	Farfetched, or missing most details	3	6
Theoretical Rigor, Comparison & Conclusion	Assumptions are reasonable and not oversimplified; physics and math are accurate and convincing; plots contain relevant data; comparison with experimental data is clearly made	Some obvious details missing	Incorrect physics, or missing most details	3	6
Professionalism	All graphic aids, audio (if using video option), and writing are clear and concise; report or video a joy to read/watch	Some obvious issues with visuals, audio, and/or writing	Painful to read or watch; or production unrelated to project	2	4
Reflection	Thoughtful and authentic	Insubstantial or vague	Missing	1	2
Total					18

See description of past projects for how to submit Google Docs or YouTube link to Gradescope.