

CEE6501 — Lecture 7.3

Miscellaneous Extra Topics

Agenda

Part 1 — Discuss Week 7 Homework

Part 2 - Adding VS Code Extension

Part 3 - Midterm Results Overview

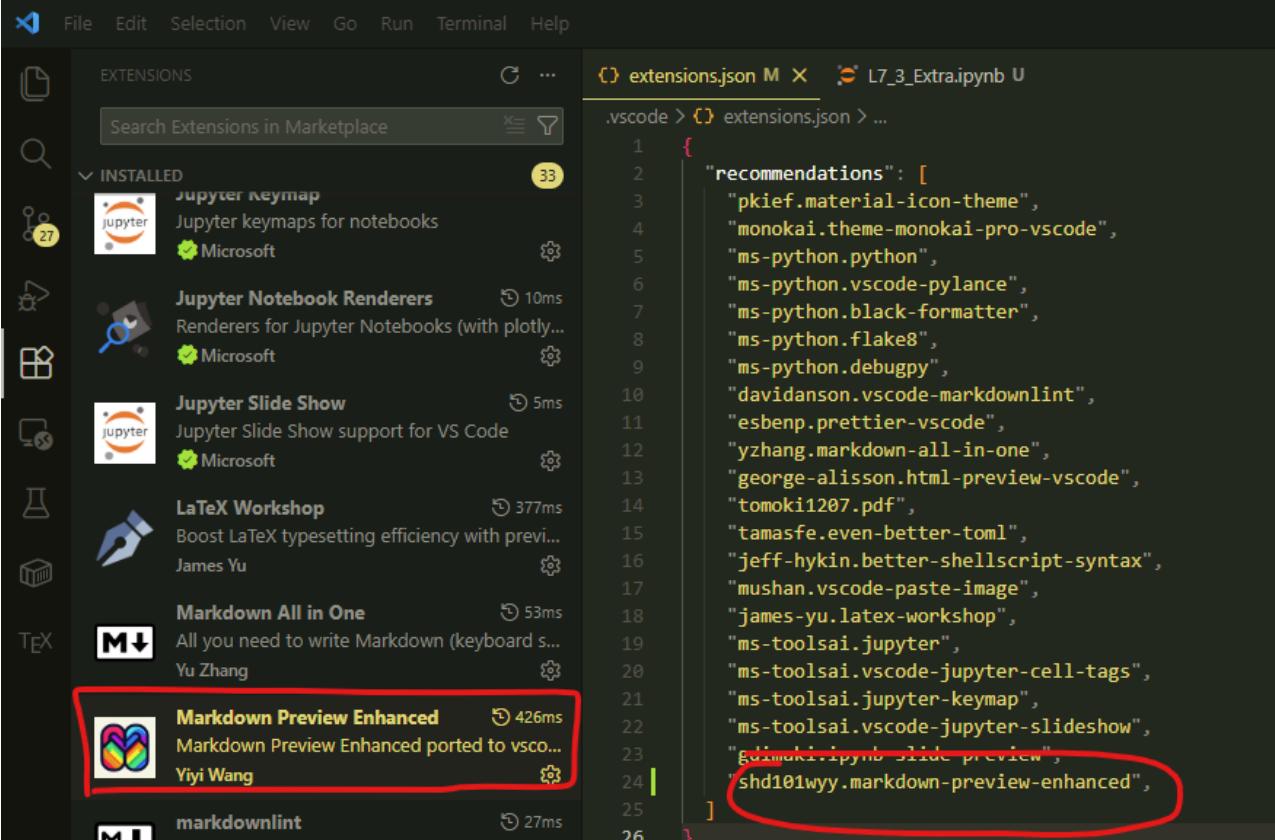
Part 4 - Discuss Feedback Quiz

Part 1 - Discuss Week 7 Homework

Part 2 - Markdown Preview Enhanced

Install VS-code Extension

Markdown Preview Enhanced has been added to the `extensions.json` file



The screenshot shows the VS Code interface. On the left is the sidebar with various icons. In the center, the 'EXTENSIONS' view is open, showing a list of installed extensions under the 'INSTALLED' heading. One extension, 'Markdown Preview Enhanced', is highlighted with a red box. On the right, the 'extensions.json' file is being edited in the code editor. The file contains a JSON object with a 'recommendations' array. The array includes many other extensions like 'pkief.material-icon-theme', 'monokai.theme-monokai-pro-vscode', etc., and at the bottom of the array, the 'Markdown Preview Enhanced' extension is listed, also enclosed in a red box.

```
.vscode > extensions.json > ...
1 {
2   "recommendations": [
3     "pkief.material-icon-theme",
4     "monokai.theme-monokai-pro-vscode",
5     "ms-python.python",
6     "ms-python.vscode-pylance",
7     "ms-python.black-formatter",
8     "ms-python.flake8",
9     "ms-python.debugpy",
10    "davidanson.vscode-markdownlint",
11    "esbenp.prettier-vscode",
12    "yzhang.markdown-all-in-one",
13    "george-alisson.html-preview-vscode",
14    "tomoki1207.pdf",
15    "tamasfe.even-better-toml",
16    "jeff-hykin.better-shellscript-syntax",
17    "mushan.vscode-paste-image",
18    "james-yu.latex-workshop",
19    "ms-toolsai.jupyter",
20    "ms-toolsai.vscode-jupyter-cell-tags",
21    "ms-toolsai.jupyter-keymap",
22    "ms-toolsai.vscode-jupyter-slideshow",
23    "guilhermeki.ipynb-slide-preview",
24    "shd101wyy.markdown-preview-enhanced",
25  ]
26 }
```

Open Enhanced Preview

Open a markdown file. For example, the `Example_SolutionPresentation.md` file in the `Code\L7` Folder.

Click the preview button top right

or

Ctrl + Shift + P
Markdown Preview Enhanced: Open Preview

L7_3_Extra.ipynb U Example_SolutionPresentation.md U L7_3_Extrapdf U

Code > L7 > Example_SolutionPresentation.md > **Midterm Review — Full DSM Solution Walkthrough**

Midterm Review – Full DSM Solution Walkthrough

In this review, we go step-by-step through a full midterm-style problem.

For each part:

- First, the **"handwritten solution"** (as it might appear during an exam)
- Then, the **"clean, structured mathematical solution"**

![Problem]../../../../Lectures/L7/assets/Midterm0.png

![Problem]../../../../Lectures/L7/assets/Midterm1.png

(a) Element-Level Global Stiffness Matrices

Element 1: Node 1 → Node 2
Element 2: Node 3 → Node 2

\$\$

$\frac{E\Delta}{L} = \frac{200 \times 5000}{7500} = 133.33 \text{ kN/mm}$

Markdown Preview Enhanced: Open Preview to the Side (Ctrl+K,V)

In this review, we go step-by-step through a full midterm-style problem.

For each part:

- First, the **handwritten solution** (as it might appear during an exam)
- Then, the **clean, structured mathematical solution**

Part III: Direct Stiffness Calculation

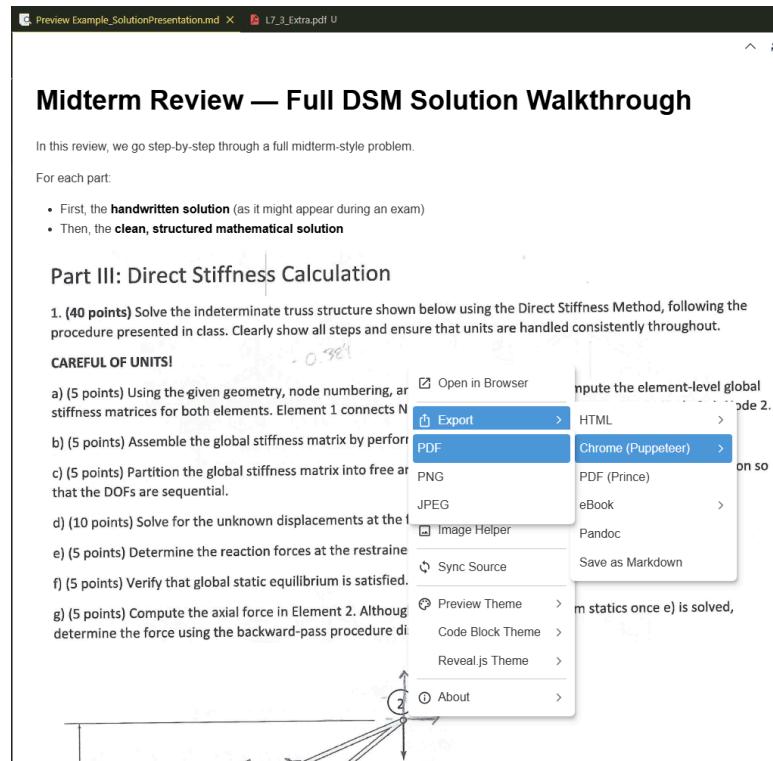
1. (40 points) Solve the indeterminate truss structure shown below using the Direct Stiffness Method, following the procedure presented in class. Clearly show all steps and ensure that units are handled consistently throughout.

CAREFUL OF UNITS!

a) (5 points) Using the given geometry, node numbering, and element connectivity, compute the element-level global stiffness matrices for both elements. Element 1 connects Node 1 → Node 2, and Element 2 connects Node 3 → Node 2.

Export to PDF

right click -> Export -> Chrome (Puppeteer) -> PDF



Find Exported PDF

The PDF should be saved in the same location as the .md file

Part 3 - Midterm Results Review

Summary

- **Highest score:** 87
- **Lowest score:** 41
- **Class average:** 67

After reviewing the distribution and overall difficulty of the exam:

All students received +15 points added to their midterm score.

This adjustment better aligns the results with course expectations.

Review the DSM Question

- Full midterm solution posted on canvas.
- Today Go through the DSM problem step by step
- Please carefully review:
 - Element stiffness formulation
 - DOF ordering and mapping
 - Assembly into the global system
 - Application of boundary conditions
 - Solving the reduced system

Part 4 - Discuss Feedback Quiz

Q1: What aspects of the course have helped you learn the material most effectively? What do you like about the course?

- Strong integration of **theory and coding**, with examples and Jupyter Notebooks making abstract concepts more practical and clear.
- **Assignments and embedded practice code** effectively reinforce material and improve coding confidence.
- **Well-structured slides and logical course organization** help connect fundamentals to real-world engineering applications.

Q2: Is the mix of slides and code lecture format working for you? why or why not?

- The mix of **slides and live coding** is working well and makes computational concepts easier to understand and more engaging.
- Students appreciate learning coding alongside theory and value the **interactive Jupyter format**.
- Suggestions include slightly fewer slides and **more in-class time for hands-on coding practice**, especially with small examples.

Q3: Do you want there to be more or less python during lectures?

- There is interest in **slightly more Python during lectures**, particularly focused on challenging topics and common mistakes.
- The current balance between theory and coding is generally working well, especially with assignments reinforcing Python skills.
- Some preference remains for emphasizing core concepts during lecture and allowing coding practice to happen independently.

Q4: Are there any specific topics or concepts that you are struggling with?

- Some difficulty arose initially with distinguishing **local vs. global coordinates** and **element- vs. joint-level stiffness matrices**.
- Coding was initially a challenge for some, but comfort with Python is increasing over time.
- Several indicated no major conceptual struggles so far, noting that working through full examples—especially by hand once—helps clarify the overall workflow.

Q5: How could the lectures or instructional methods be improved to support your learning?

- The pace can feel dense in a single sitting; slightly slowing key sections could help.
- Adding **more in-depth, fully worked numerical examples**—especially ones similar to exam-style problems—would strengthen conceptual connections and exam preparation.
- Incorporating **more interactive, in-class problem-solving time** (e.g., working through a full example together or testing code live) would improve engagement and understanding.

Q6: What do you find most challenging about the assignments in this course?

- The **Python implementation** is the primary challenge, particularly translating clear theoretical steps into structured, logical code.
- The **time commitment and overall assignment length** can be significant, especially for coding-heavy tasks.
- The level of coding required can be demanding, particularly for those with limited prior programming experience.

Q7: How do you feel about the pace of the course?

- The overall pace is generally viewed as appropriate and well-balanced.
- Lectures can feel fast-paced at times, particularly given the volume of material covered.
- The pace may require additional effort outside of class, especially when combined with multiple assignment types.

Q8: How do you feel about the organization of the course and lectures? Are things clear to you? Why or why not?

- The course and lectures are viewed as **very well organized and clearly structured**, building step by step from fundamental concepts.
- Expectations are clear, including exam preparation, and the progression from basics to more advanced topics supports understanding.
- Assignments deepen comprehension, though there is some concern about overall workload and a desire for more numerical examples within lectures.

Q9: What additional resources or support would help you succeed in this class?

- Additional **Python coding tips and guidance** would be helpful, particularly for strengthening programming skills.
- **Practice exams, sample questions, and assignments aligned with exam style** would improve preparation and clarify expectations.
- A few would appreciate more examples connecting course material to **industry or real-world applications**, while many feel current resources are sufficient.

Q10: How much are you using AI tools to complete assignments?

- AI is primarily used for **debugging, troubleshooting errors, syntax help, and formatting**, often after attempting the work independently.
- Some use AI for **code suggestions, understanding specific lines of code, structuring solutions, plotting, or improving presentation**, while still ensuring they understand the logic.
- A few report moderate use (around ~50%) for coding support, particularly when lacking a strong programming background.
- Some complete assignments largely independently, using AI mainly for presentation or minor syntax corrections.
- There is general awareness that AI can be helpful but must be **carefully checked**, as it can produce incorrect assumptions or unit errors.