

Elements of a Presentation

- Clearly state the goal of the talk
- Provide detail to **understand** the gist
- Summarize results
- Remind and given additional links

👉 **Pro tip:** show your main result first, slide 1

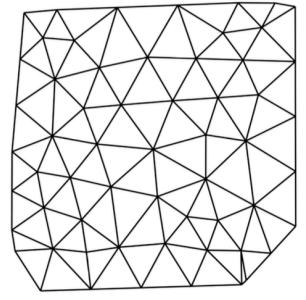
Coarsening problem
Our approach: coarsening as an RL problem

The efficiency of AMG solver depends on:

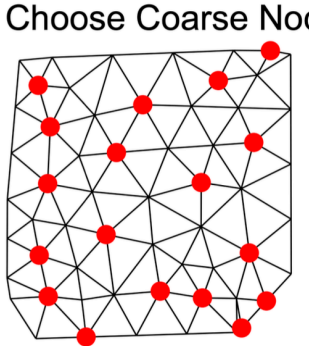
- The choice of restriction and interpolation operators [Luz et. al., ICML 2020]²
- The selection of the coarse grid [This paper]

Combined together → Fully learned AMG.

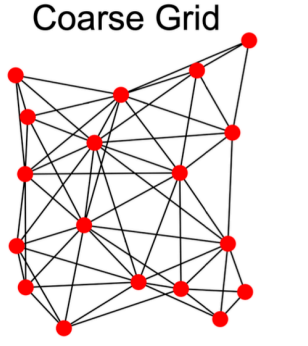
Fine Grid



Choose Coarse Nodes



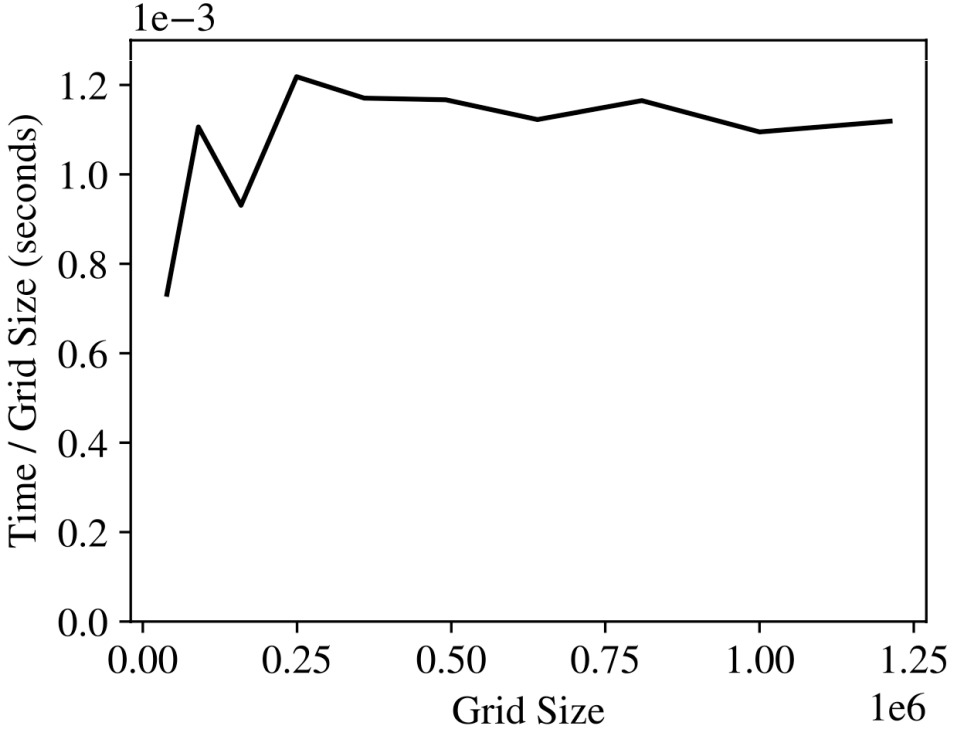
Coarse Grid



²Luz, I., Galun, M., Maron, H., Basri, R. and Yavneh, I., 2020, November. Learning algebraic multigrid using graph neural networks. In International Conference on Machine Learning (pp. 6489-6499). PMLR.

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$O(N)$ in grid size
Conclusions



We showed:

- Coarse-grid selection is learnable
- Guaranteed convergence
- Linear time complexity in the grid size
- Outperforming previous heuristic
- Scalable; small training examples and arbitrarily large test problems

Paper info:

- Taghibakhshi, A., MacLachlan, S., Olson, L. and West, M., 2021. Optimization-Based Algebraic Multigrid Coarsening Using Reinforcement Learning. NeurIPS 2021
- Paper preprint: <https://arxiv.org/pdf/2106.01854.pdf>
- Code for reproducing the results: https://github.com/compdyn/rl_grid_coarsen

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Do's and Don'ts

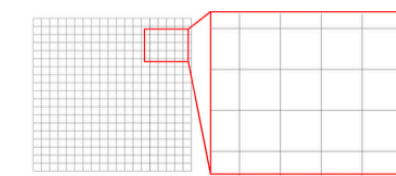
- In a talk, you should avoid using long sentences that the audience needs to read and instead use short, pithy statements that support your figures. Long sentences force the audience to read what you have on the screen instead of listening to your concise story. Slides with too much information also have this shortcoming, so avoid densely packed slides with algorithms, figures, mathematical expressions, and other details that muddle a short presentation.
- Avoid punctuation
- Outlines are bad
- Math is bad
- Use page numbers
- Cite papers on the slide (`\cite{}` is bad)
- `\caption{}` is bad
- Figures should be large, use thick lines, and use large fonts
- If the figure is not yours, **cite it**

 **Pro tip:** match your fonts

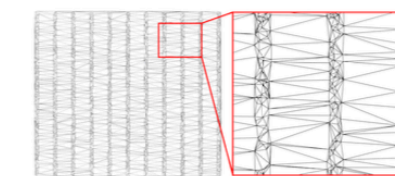
Test data

Test Set: Mesh families with very diverse and challenging attributes:

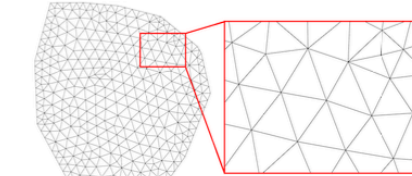
Structured: 18 structured grid with different sizes



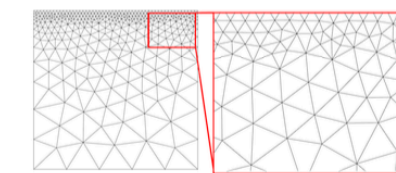
Aspect Ratio: 12 unstructured convex grid with different average mesh aspect ratio



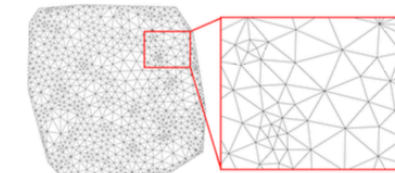
Different Size: 42 unstructured convex grids with varying grid size



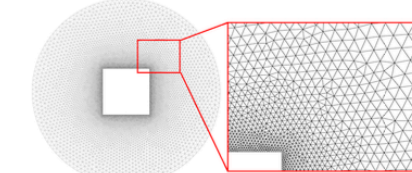
Graded Mesh: 12 unstructured grids with different convex shapes and graded meshes



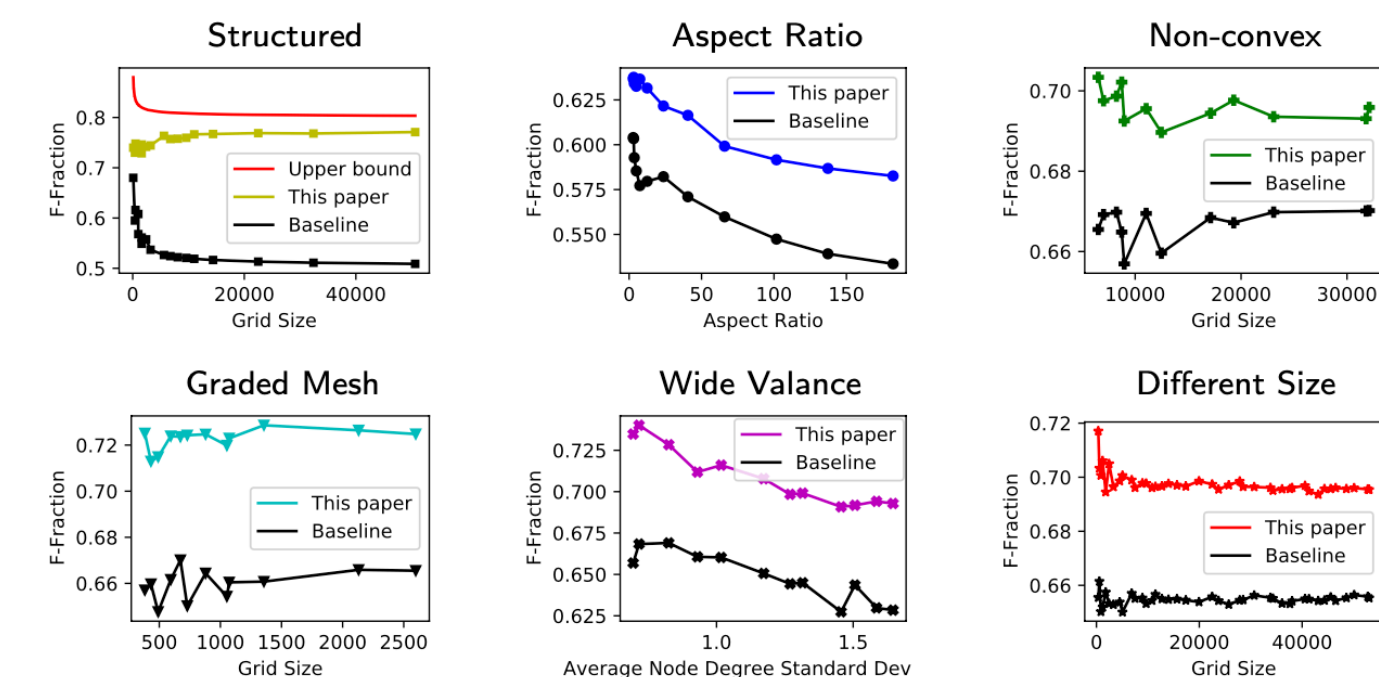
Wide Valance: 12 unstructured convex grids with different average node degree STD



Non-convex: 12 unstructured non-convex grids



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Quality of solution: higher F-Fraction is better



Golden Rule

Stay on time



Tentative Sign-up		
Date	Timeslot	identifier #
W April 26	1: 11:00-11:10	
	2: 11:11-11:21	
	3: 11:22-11:32	
	4: 11:33-11:43	
	5: 11:44-11:54	
	6: 11:55-12:05	
	7: 12:06-12:16	
M May 01	1: 11:00-11:10	
	2: 11:11-11:21	
	3: 11:22-11:32	
	4: 11:33-11:43	
	5: 11:44-11:54	
	6: 11:55-12:05	
	7: 12:06-12:16	

👉 **Pro tip:** at most one slide per minute

👉 **Pro tip:** use your phone timer

Presentation Rubrics

- 30% of the grade 🤯
- project 0: idea (0)
- project 1: goals (1)
- project 2: outline (1)
- project 3: results (1)
- project 4: results (2)
- project 5: slides (20)
- project 6: reflections (5)

 **Pro tip:** keep it focused

- **Presentation clarity:**
 - Are you on time?
 - Do you follow the Do's and Don'ts?
 - Did you provide the audience with the right level of detail?
- **Presentation scope:**
 - Did you clearly define what you're studying?
 - Did you provide a clear summary?
 - Did you execute a MWE? (N/A in some cases)
- Clear statement of the problem (mathematically)
- Precise definition of the "the issue"
- Is there a clear *take-away* for the audience?
- Citation
- Lessons learned: what worked and what did not
- Is it clear what you both worked on?