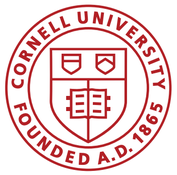


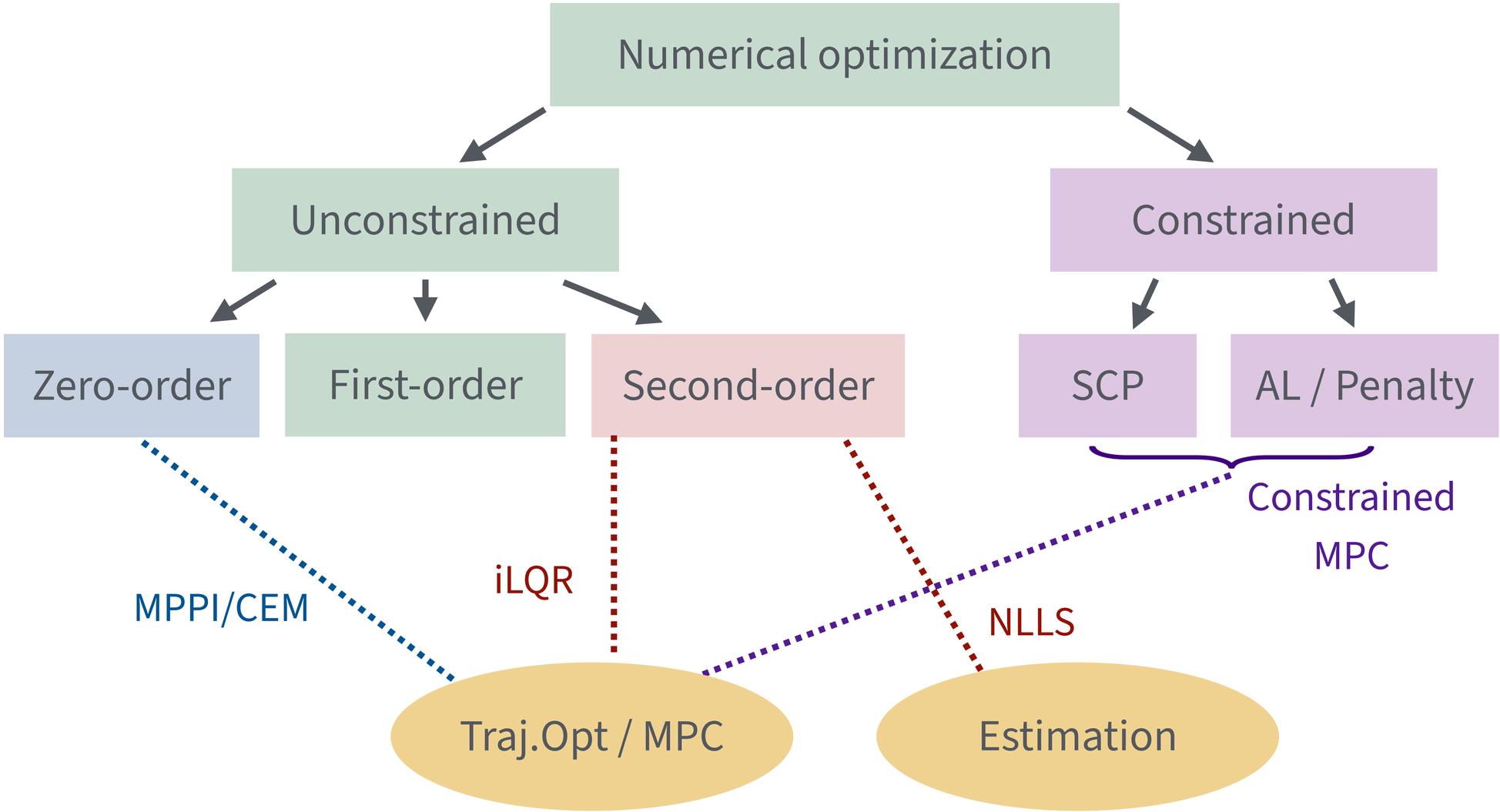
CornellBowers
Computer Science

CS 5757: Course Summary

Preston Culbertson

Key thesis: Optimization provides a unified framework for robot decision making.

Course roadmap



Key questions when picking a method

- **Is there sparsity I can leverage?**
  - Consider matrix-free methods / sparse linear algebra to scale well.
- **Do I have accurate gradients / Hessians of my objective/constraints?**
  - If **no,** use a zero-order method (CEM / evolutionary alg).
  - If **yes,** typically want (Gauss-)Newton for speed.
- **Does my problem have hard constraints?**
  - Strongly suggest a “real” solver (CVX/SNOPT) for this case.

Where do I go from here?

- **To learn more optimization:**
  - CS 4220: Numerical Analysis (if you like math)
  - **Boyd's lectures** on Convex Optimization (build fundamentals!)
- **To learn more robotics / control:**
  - CS 4756: Robot Learning (good survey of ML side of the world)
  - MAE 6760/6780: Model-based Estimation / Multivariable Control
  - Russ Tedrake's lecture notes on **control** / **manipulation**.

Thanks everyone for a great semester!