

Fast-by-design Reliable MPC for Robotics

A modular and open framework

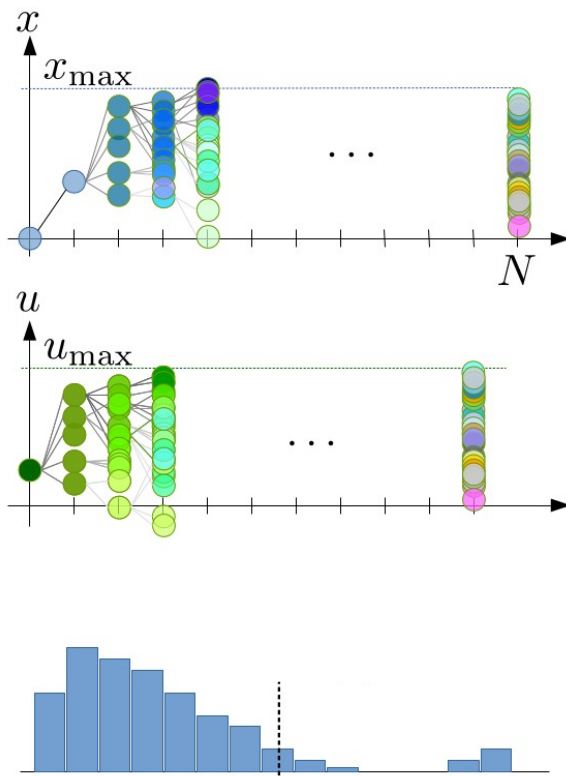
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Model Predictive Control

Why MPC?

- Has **foresight**
- Encodes **constraints**
- **Optimal** operation
- **Fail-safe** control
- Uncertainty-aware



Conventional approach...

- Plan with **deterministic** model
- Solve **off-board**
- Use **linear** dynamics
- **High precision** arithmetic

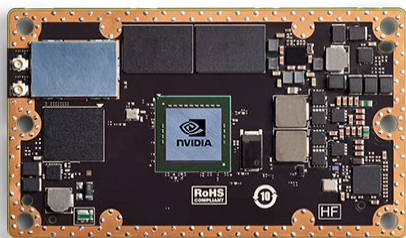


Modern approach...

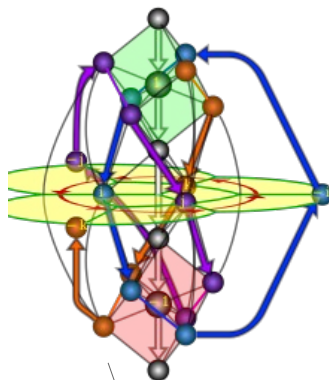
- Make **contingency plan**
- Go **embedded**
- Use **nonlinear** dynamics
- **Finite-precision** arithmetic

Embedded Implementations

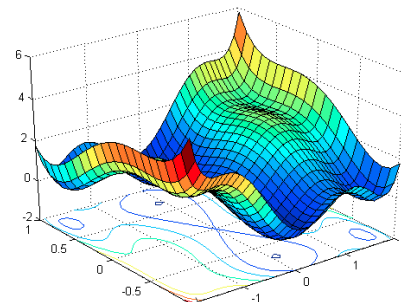
Fast ■ ■ ■ Scalable ■ ■ ■ ■ Platform-aware ■ ■ ■ ■ ■ Reliable



Embedded GPUs



Complex Dynamics



10x-500x
faster algorithms

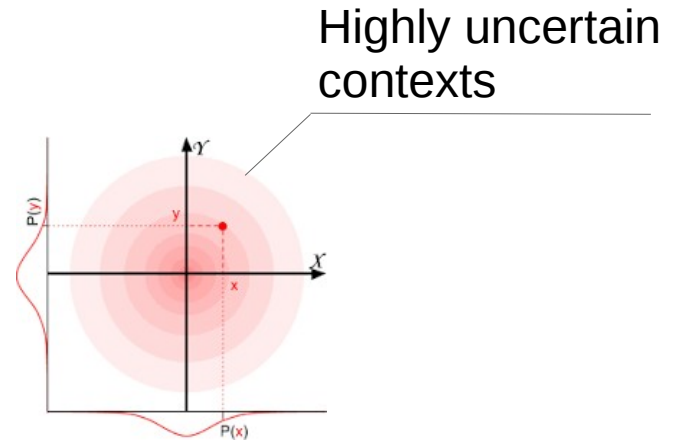
Impact



Autonomy



Human-Robot Interactions



Open, Modular, Reuseable Architecture