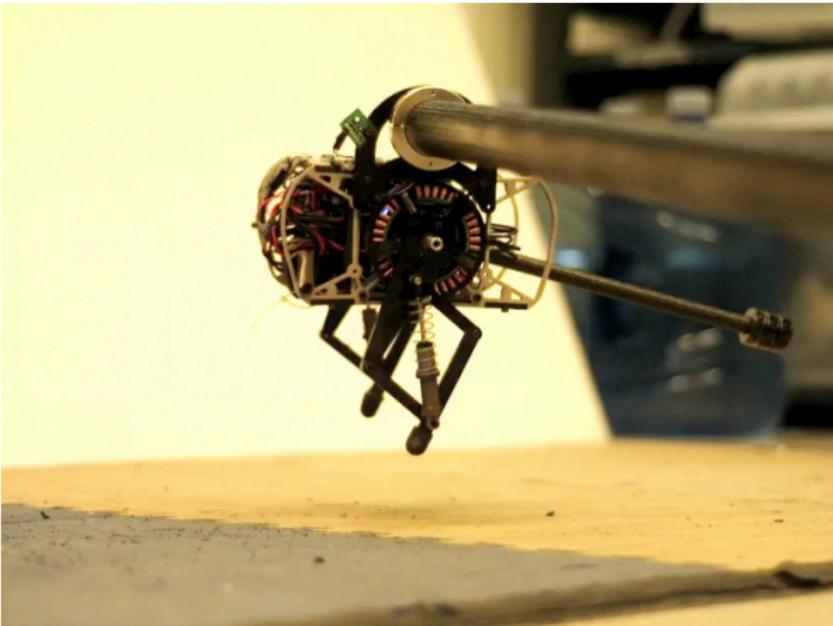
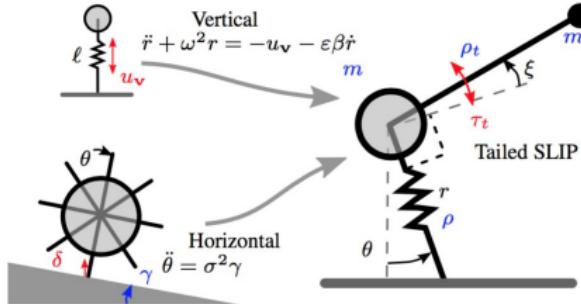


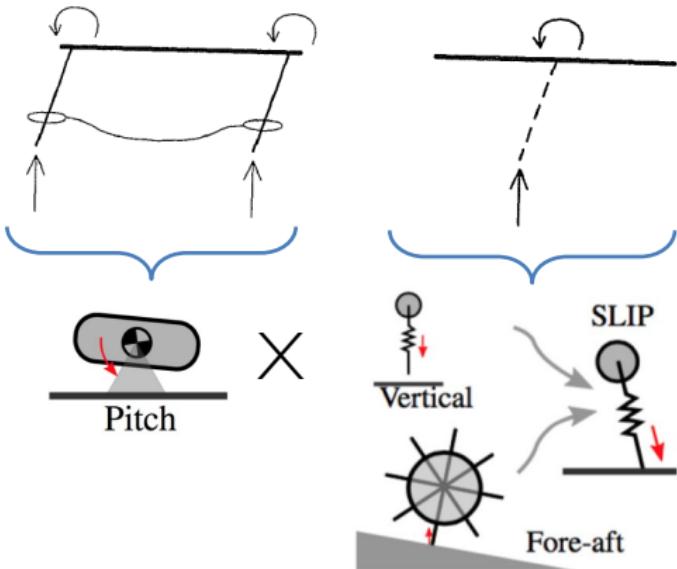
# Jerboa planar hopping

- Tail-instantiated vertical hopping—De and Koditschek [2015a,b]

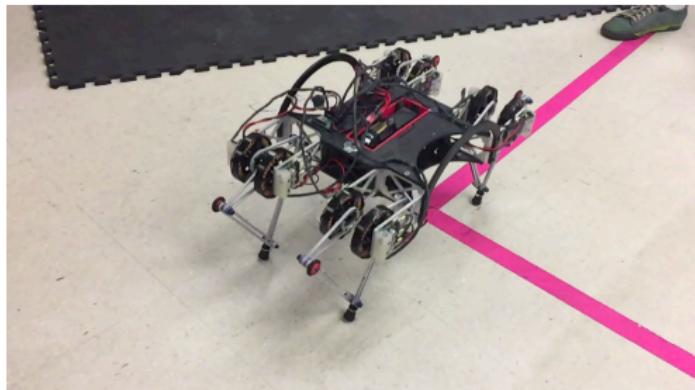
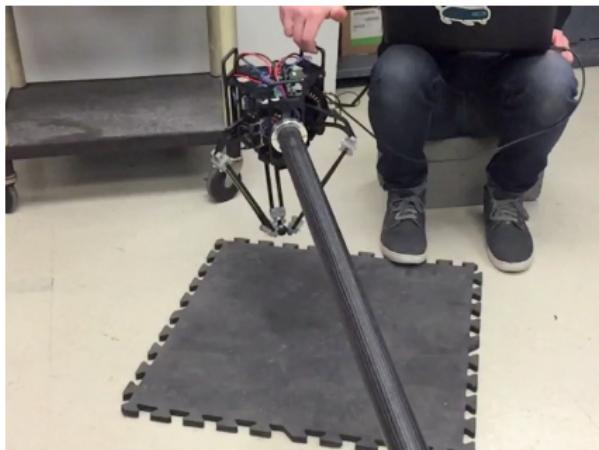
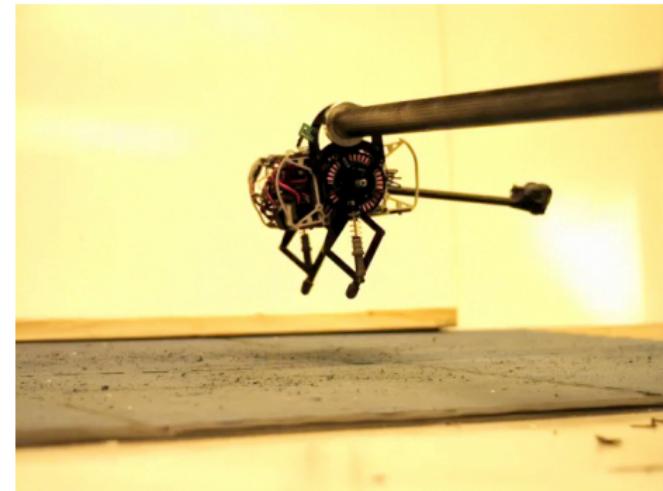


# Minitaur pronking

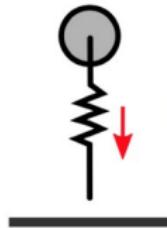
- Monoped control: SLIP as parallel composition (same controllers as Jerboa)
- Intra-group synchronization  $\approx$  attitude control



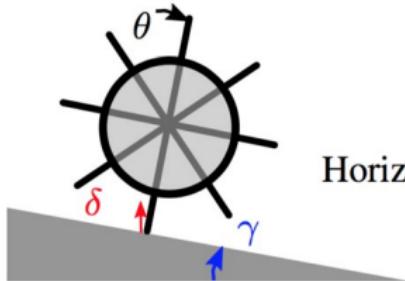
# Reuse



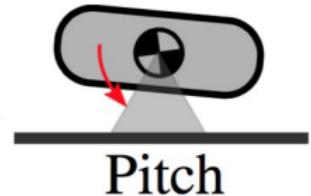
## Generate



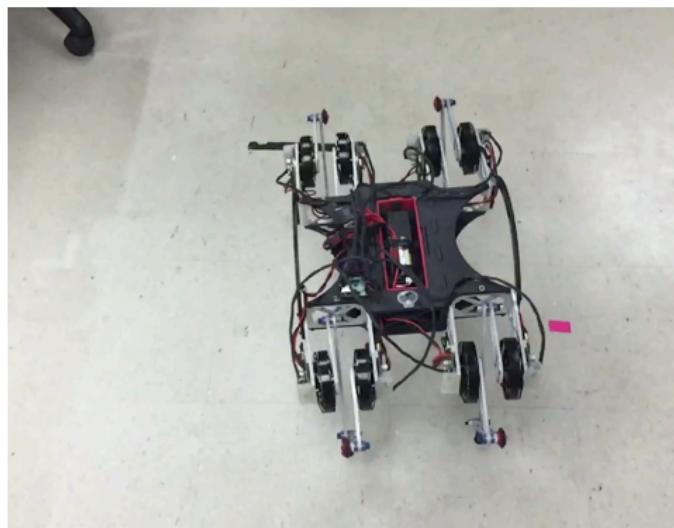
Vertical



Horizontal



Pitch



# Where do compositional techniques lie?

	Holistic	Compositional
Stability guarantees	Methods exist	Not yet, but progress e.g. De and Koditschek [2015a]
Underactuation	Principled methods exist (but need very good models)	✗
Optimality guarantees	Possible	✗
Modeling/calibration	Must be precise	Can be crude
Controller synthesis (e.g. optimization dims)	$(n \text{ inputs}, n \text{ outputs}) =$ $x^n$	$(1 \text{ input}, 1 \text{ output}) \times n$ $= n$
Reuse	✗	✓
Generate	✗	✓

## Summary

- A compositional approach to synthesis allows us to reuse templates on different robots
- ...and also the generate new combinations