

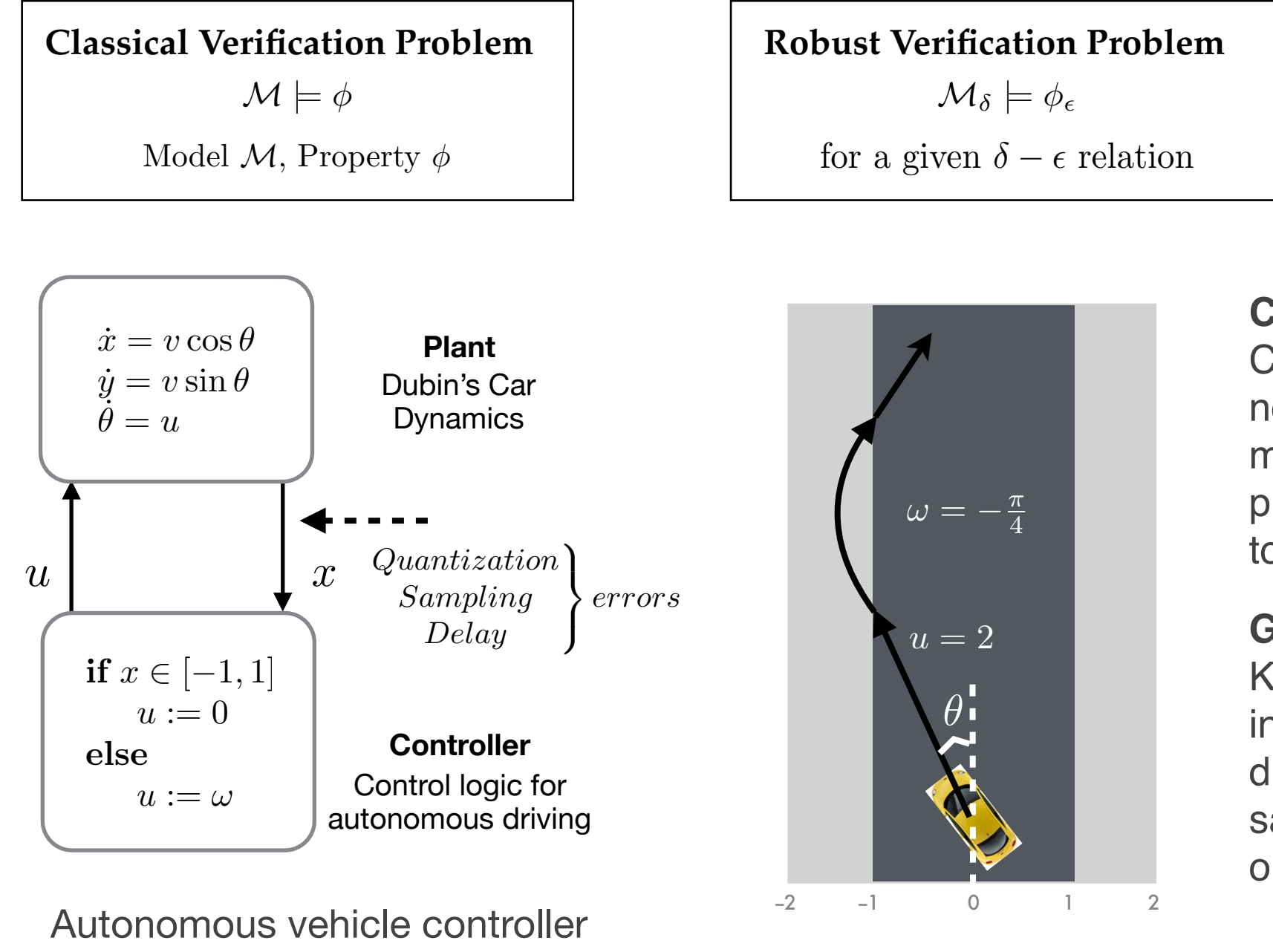
# CAREER: Robust Verification of Cyber Physical Systems (CPS)

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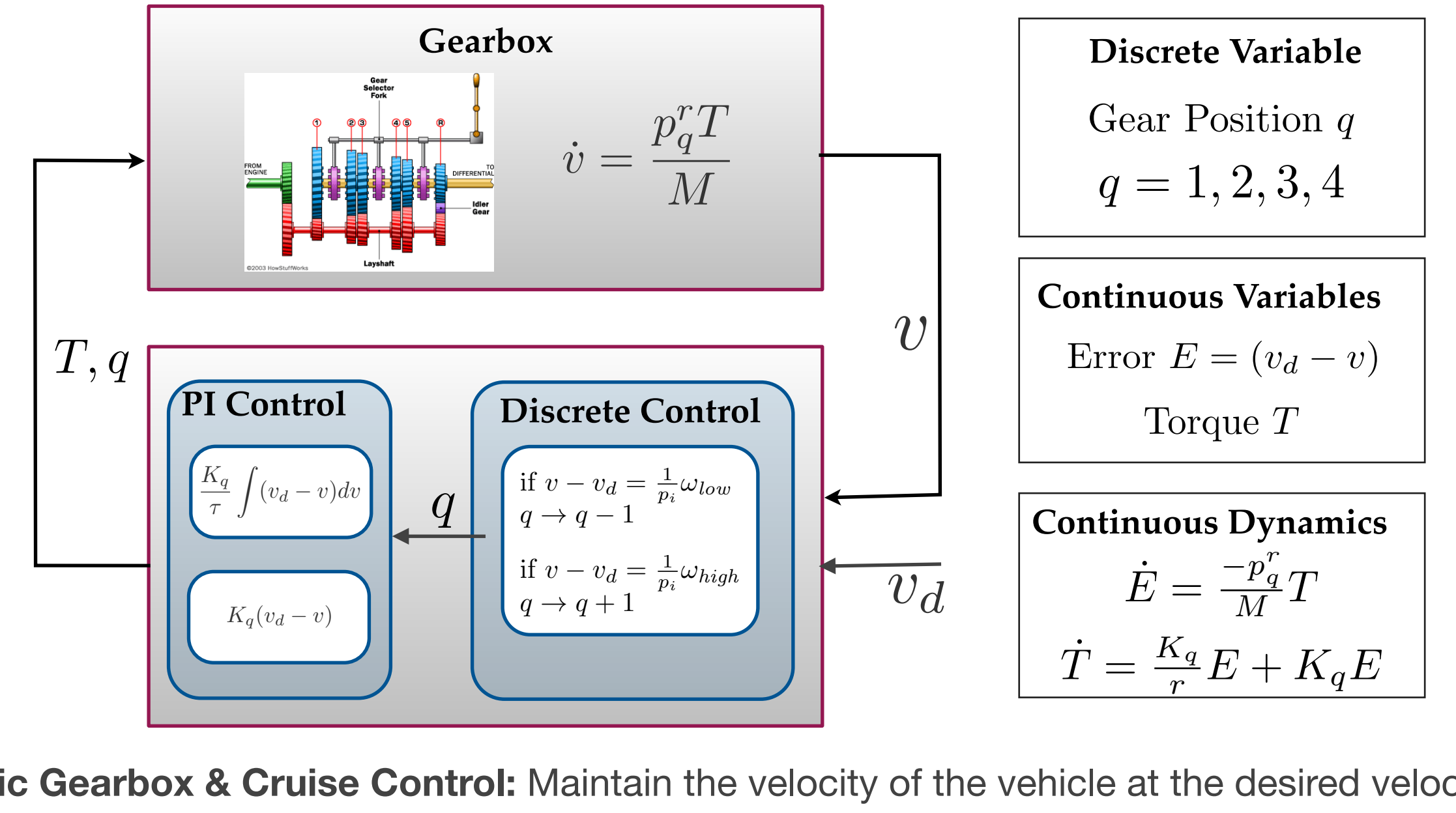
## Robust verification

Guarantee system correctness even in the presence of perturbations.

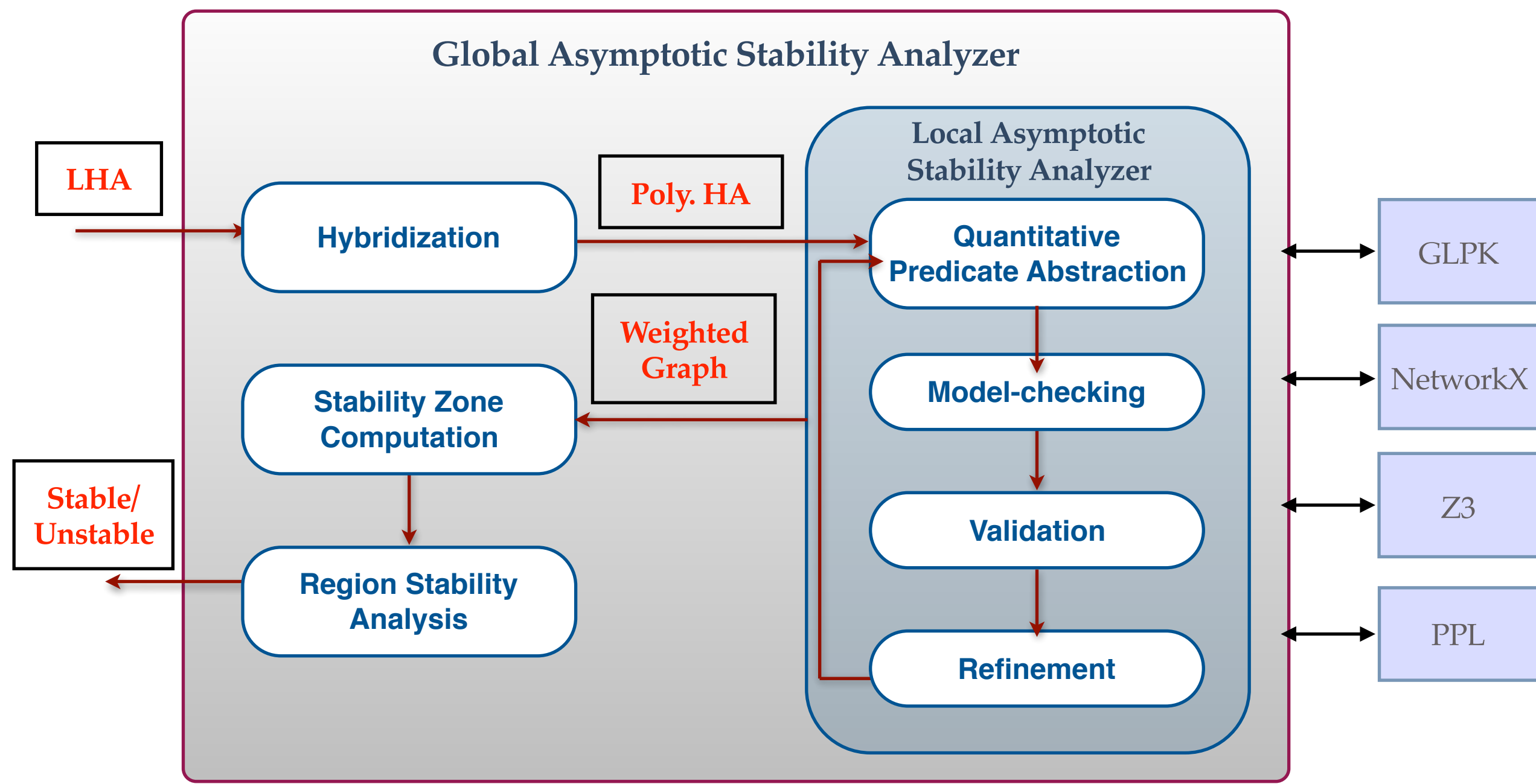


## Stability in Cruise Control

Small perturbations in the initial state/input lead to small deviations in behavior.



## AVERIST: Algorithmic Verifier for Stability



Tool webpage: <http://software.imdea.org/projects/averist/>

## Analysis

Dimension/ name	AVERIST				STABHYLI		
	Regions	Runtime	Proved Stability	Degree	LF found	Runtime	
2D	AS1	129	31	Yes	6	Yes	8
	SS4 1	9	<1	Yes	8	–	452
	SS8 1	17	<1	Yes	6	–	443
	SS16 1	33	1	Yes	4	–	177
3D	AS 4	147	194	Yes	6	–	410
	SS4 4	771	484	Yes	2	Yes	75
	SS8 4	771	470	Yes	2	Yes	15
	SS16 4	771	568	Yes	2	Yes	138
4D	AS 7	81	625	Yes	2	–	12
	SS4 7	81	119	Yes	2	–	101
	SS8 7	153	234	Yes	2	–	1071
	SS16 7	297	533	Yes	2	–	339
	AS 9	–	out	No	4	Yes	34
	SS4 9	81	125	Yes	4	–	105
	SS8 9	153	247	Yes	2	–	16
	SS16 9	–	–	–	–	–	–

1. Linear to polyhedral dynamics abstraction.
2. QPA to prove local asymptotic stability.
3. Stability zone construction using QPA.
4. Region stability with respect to stability zone.

