

# Position and Force Constraints in Underactuated Tendon-Driven Systems

Byungchul Kim<sup>1</sup>, Useok Jeong<sup>2</sup>, and Kyu-Jin Cho<sup>1</sup>  
<sup>1</sup>Seoul National University, <sup>2</sup>Hyundai Motor Company

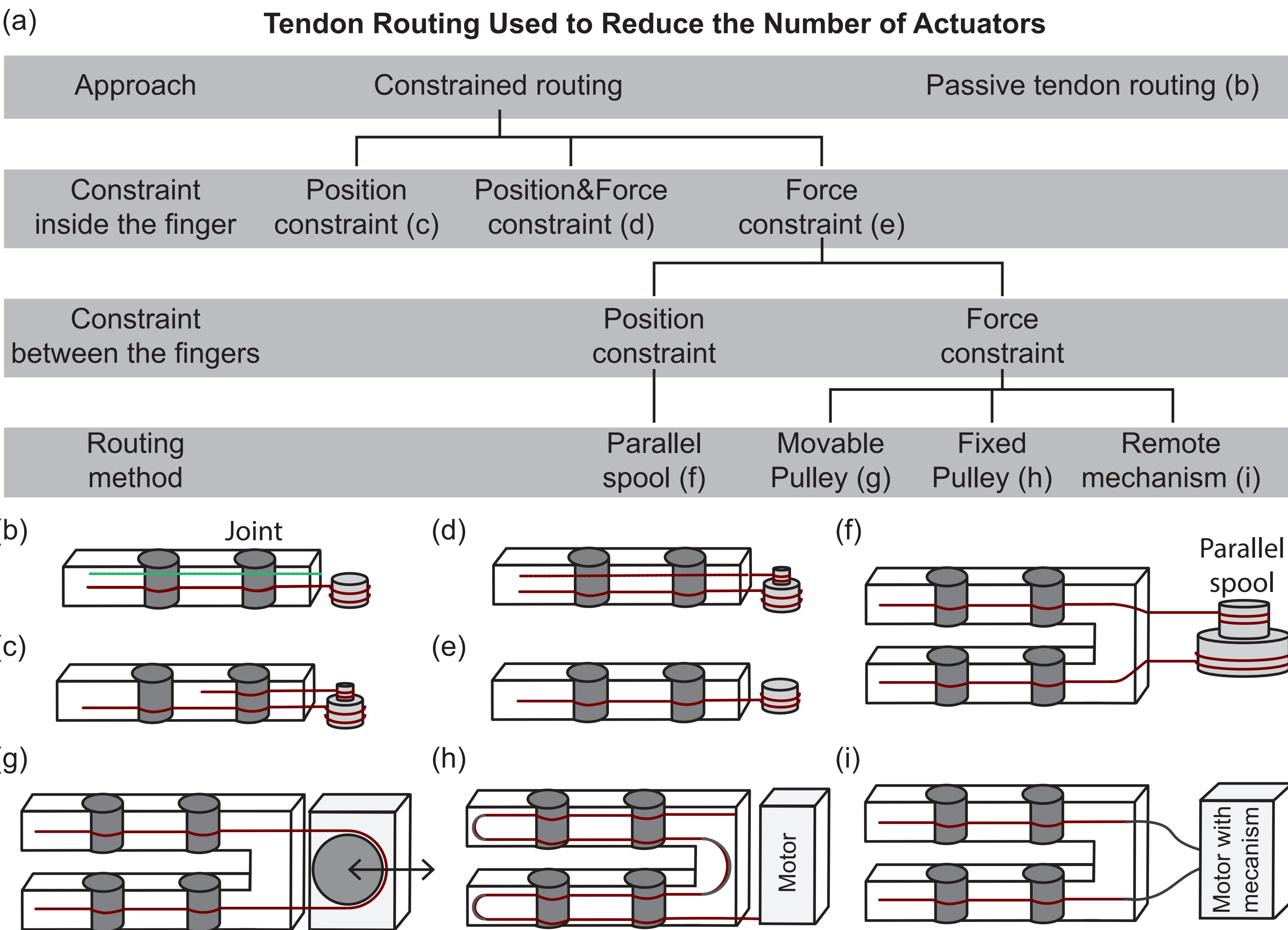
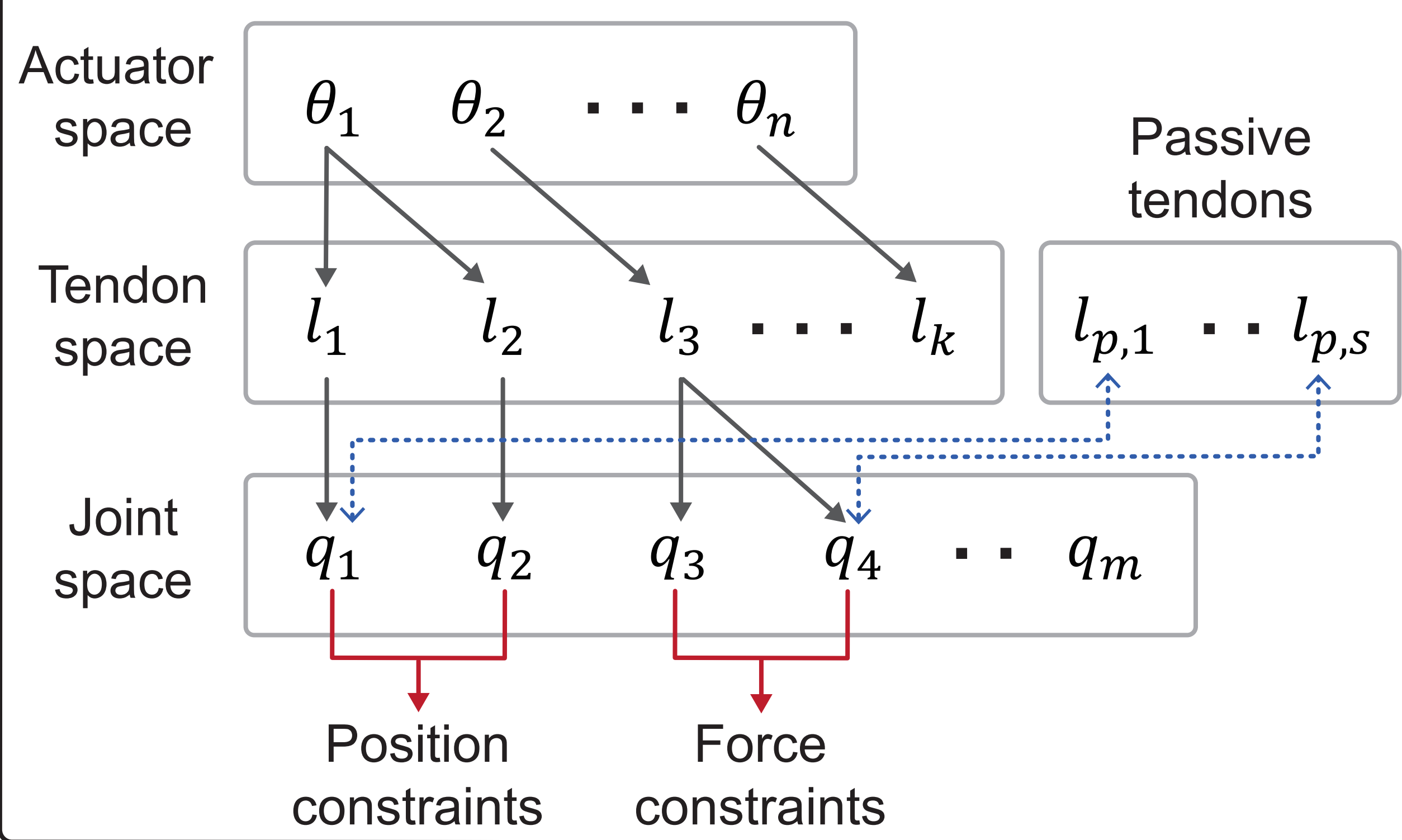


What is the “optimal” number of actuators given robotic system?

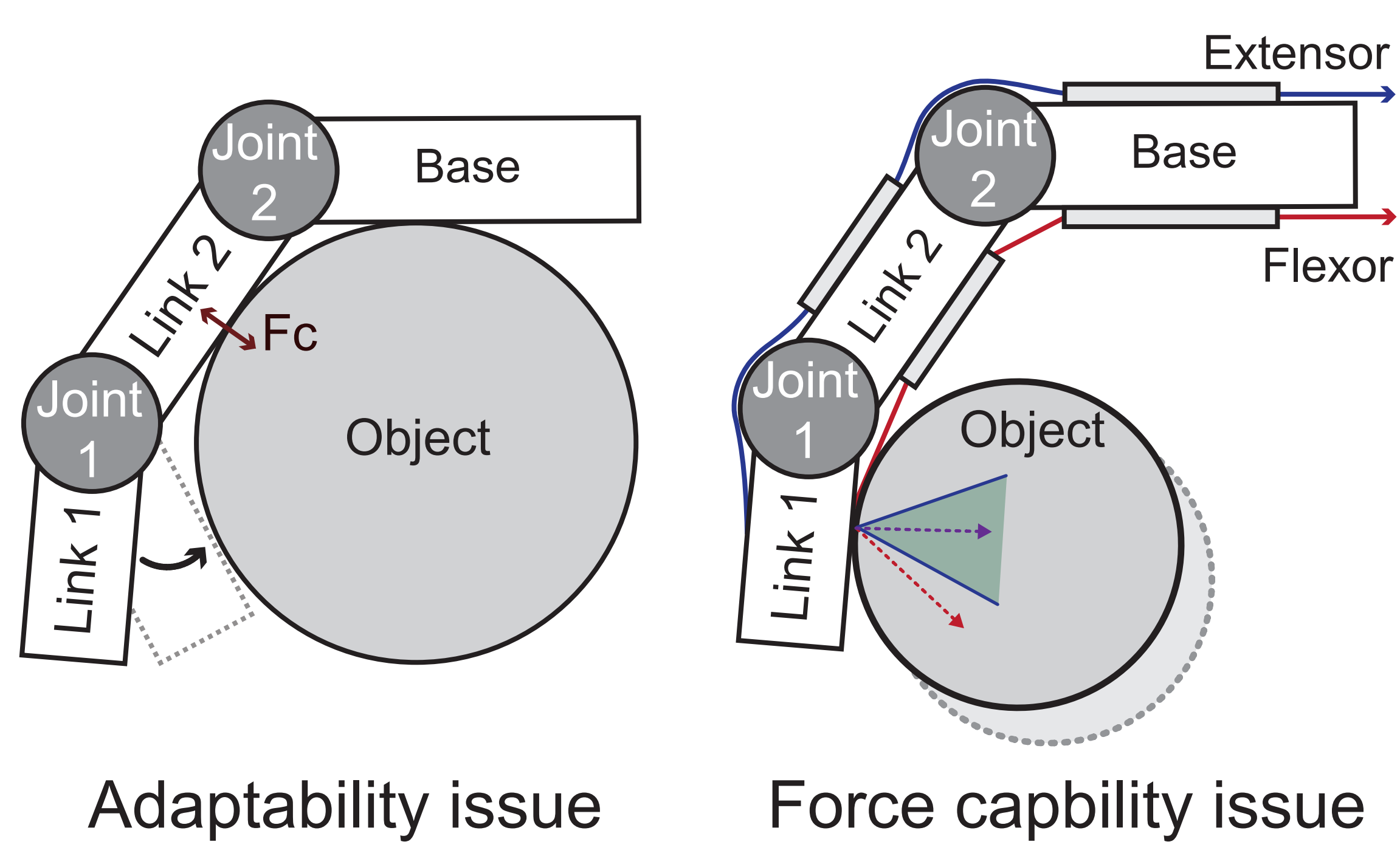


- Actuator increases costs, complexity, volume, and weight.
- Minimal number of actuation reduces controllability.

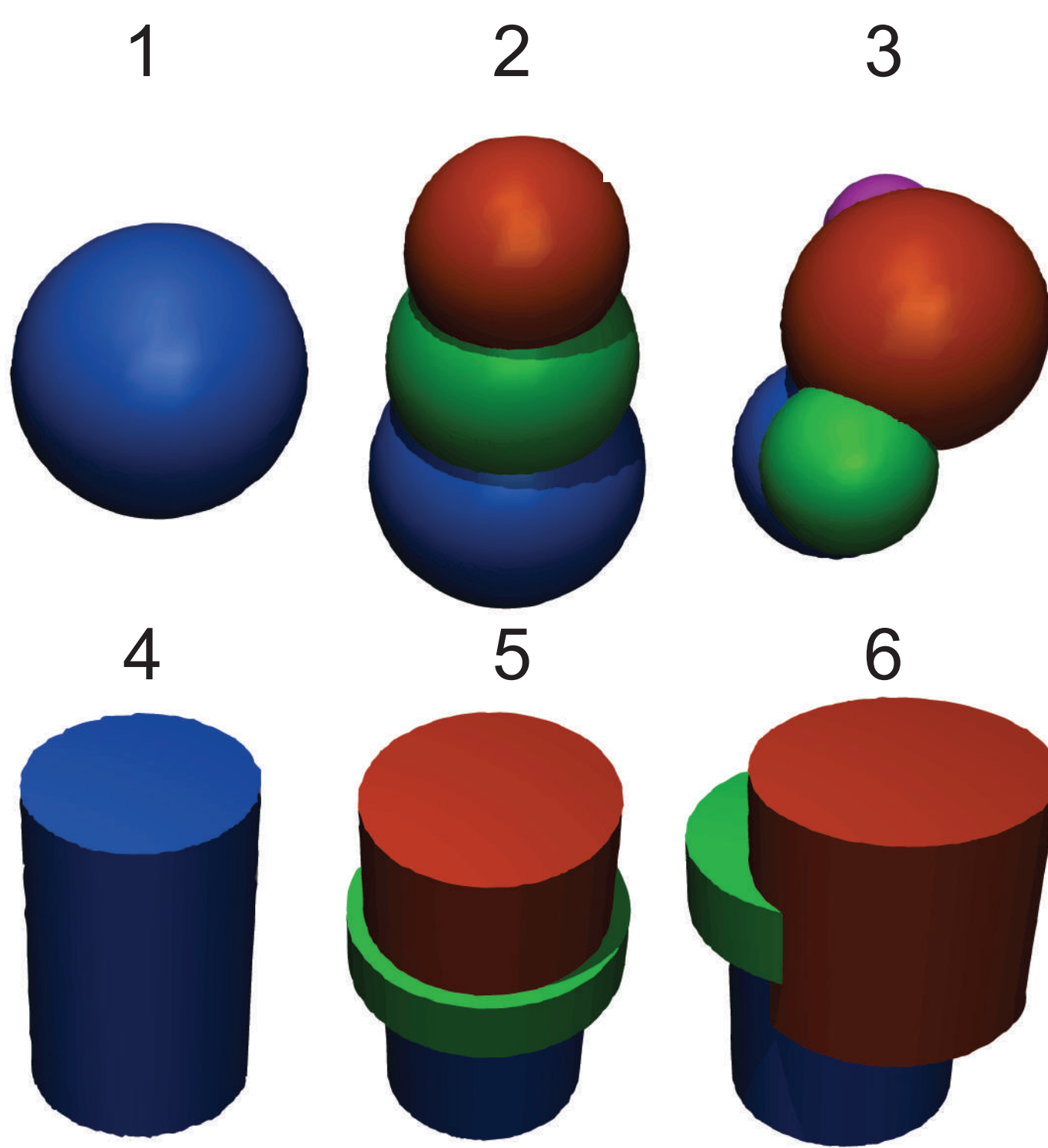
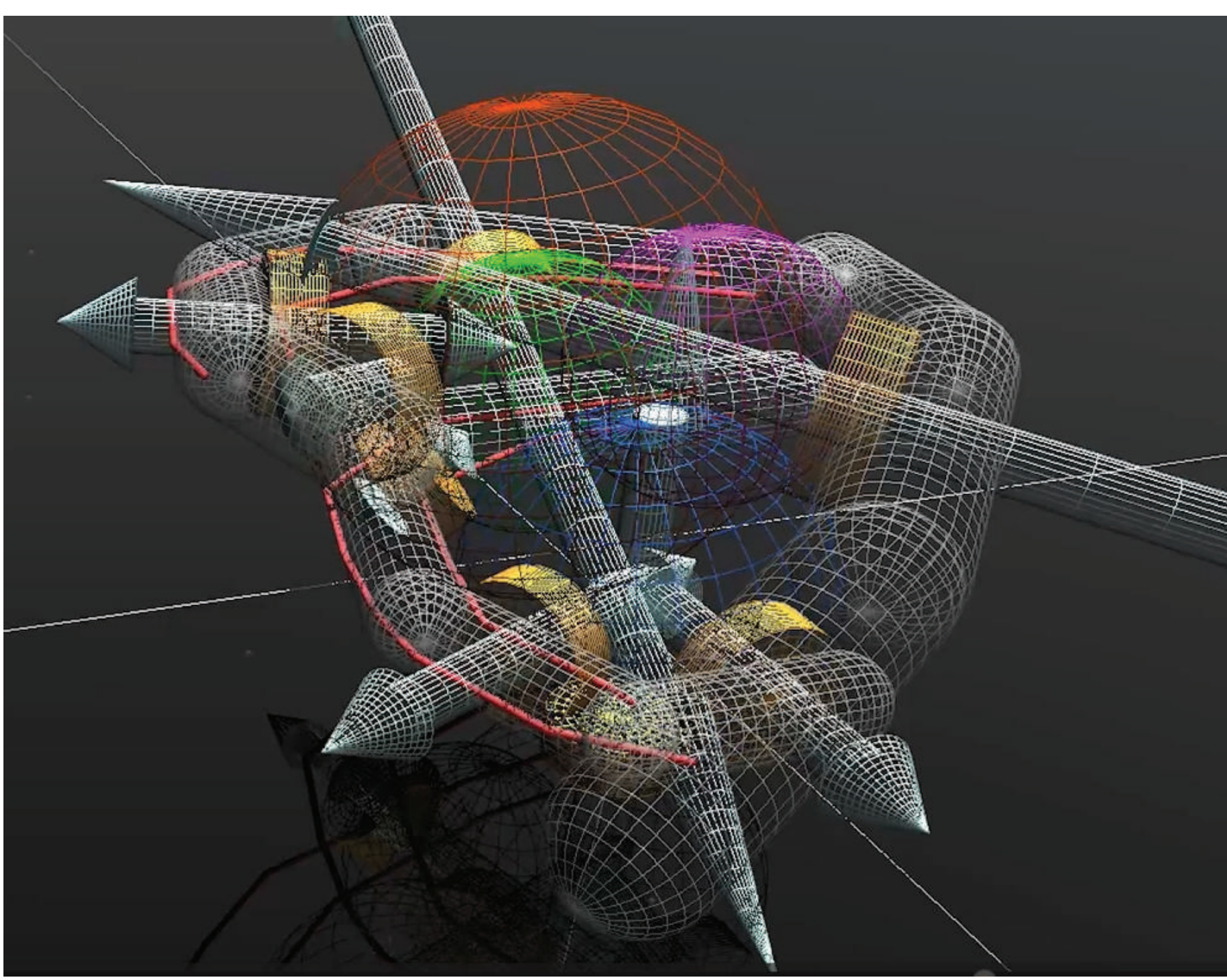
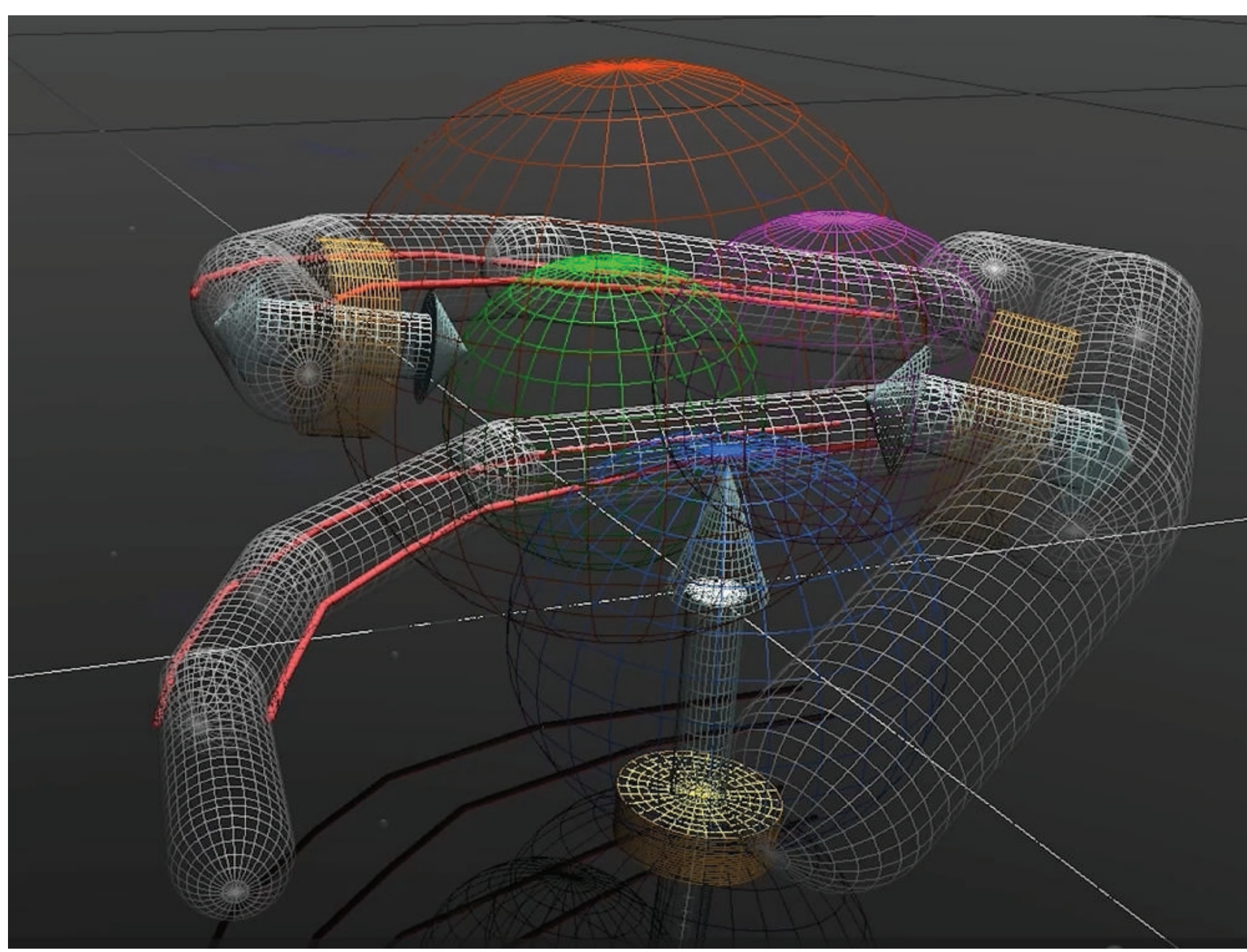
## Under-actuated Tendon-driven Mechanism (UATDM)



## Issues in UATDM



## Results - Adaptability issue



	Contact Point		Contact Force	
	P	F	P	F
obj1	4	6	143.6	338.6
obj2	5	6	218.3	629.5
obj3	4	8	163	517.2
obj4	3	5	100.4	537.5
obj5	4	5	139.2	396.1
obj6	4	5	117.5	358.3

## Results - Force capability issue

