Script

So our unique feature is the implementation of the PID. We think it’s creative since we haven’t thought with a classic feedback loop to model the whole system, we thought more physical-wise the system.

In fact first we thought about the system any controller. And this is merely an undamped system. Then, as you can see here you have zp at the output of the system, the controller must be after the plant, since its equation is directly related to the value of zp. So in the end we could have stopped here, but we had to take into account the road otherwise nothing would have happened. So we watch the equations and it is pretty straight forward to see that we must add what we called input zw here. But when you see the whole system it’s more a perturbation than an input in the end. With that model we achieved the same result as the equation we could use in the subject.

Interpretation of the result

In the end, we can say we managed to comply with the requirements for approximately every controller (and keeping the strength in the actuators below 10kN as well). But regarding the settling time, we achieve better time with Hinf whereas with overshoot the best one is skyhook.

But Hinf is harder to tune. You don’t have many room for improvement as well. The thing is, as soon as you have computed your K matrix from the equation it’s impossible to go back. If your actuators or something else get degraded with time which can result in a gain of inertia, a loss of stiffness for spring so a total change of your matrix A, you won’t change the value of K easily. Whereas it’s easier to tune the parameter of your parameter in the skyhook system.