# Tuning a cruise control model

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I have a cruise control model, and want to tune the PID for best performance.

Et billede, der indeholder diagram, Plan, Teknisk tegning, Rektangel

Automatisk genereret beskrivelse

The criteria that the PID tunes is either faster settling time to steady state or overshoot.

## Fastest settling time

Et billede, der indeholder tekst, Kurve, linje/række, nummer/tal

Automatisk genereret beskrivelseEt billede, der indeholder tekst, linje/række, Kurve, skærmbillede

Automatisk genereret beskrivelseSettling time makes cruise control more comfortable. You don’t want to start cruise control and then wait 50 seconds to see the effect.

### Et billede, der indeholder tekst, kvittering, nummer/tal, skærmbillede Automatisk genereret beskrivelsePros

Settling time is the fastest it can be at 35,4 seconds.

### Cons

As a consequence of faster settling time, the system overshoots some more. One is then more likely to get a ticket while cruise controlling if a policeman is nearby.

Time over driving limit:

Looking at the km/h chart, the velocity settles

## Legal driving

Et billede, der indeholder Kurve, linje/række, diagram, Parallel

Automatisk genereret beskrivelseEt billede, der indeholder tekst, kvittering, nummer/tal, skærmbillede

Automatisk genereret beskrivelseEt billede, der indeholder tekst, Kurve, linje/række, skærmbillede

Automatisk genereret beskrivelseNo driver of the system should passively get drivers tickets while cruise controlling.

### Pros

With an overshoot of less than 1%, no tickets should be given to drivers of the system.

### Cons

With a Rise time of 294 seconds and settling time of 465 seconds, this system is super slow.

As a driver I would be annoyed by the fact that I would have to wait 5 minutes until manually control of the speed weren’t required. Looking at the velocity of the car, it dips down to 50km/h again after settling.

## Compromised driving

Et billede, der indeholder tekst, kvittering, nummer/tal, Font/skrifttype

Automatisk genereret beskrivelseEt billede, der indeholder tekst, linje/række, skærmbillede, Kurve

Automatisk genereret beskrivelseA system that satisfies both being moderate fast and moderate stable.

Et billede, der indeholder Kurve, linje/række, tekst, skærmbillede

Automatisk genereret beskrivelse

Specifications that stands out:

The last parameter being the approximate time above 103% of the maximum speed limit.

is still a lot of time being above my estimated of what’s allowed to overshoot the speed limit with. That being said, I think it’s as good as the system gets.