

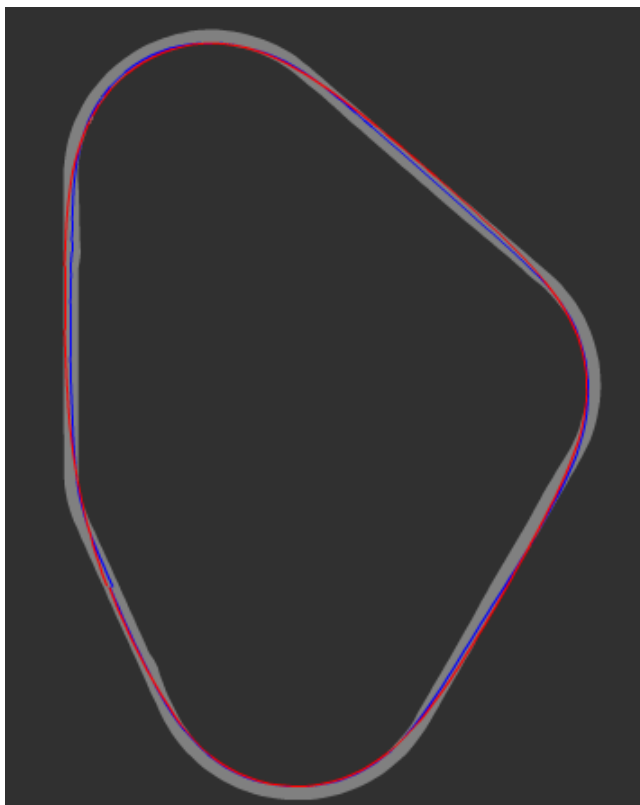
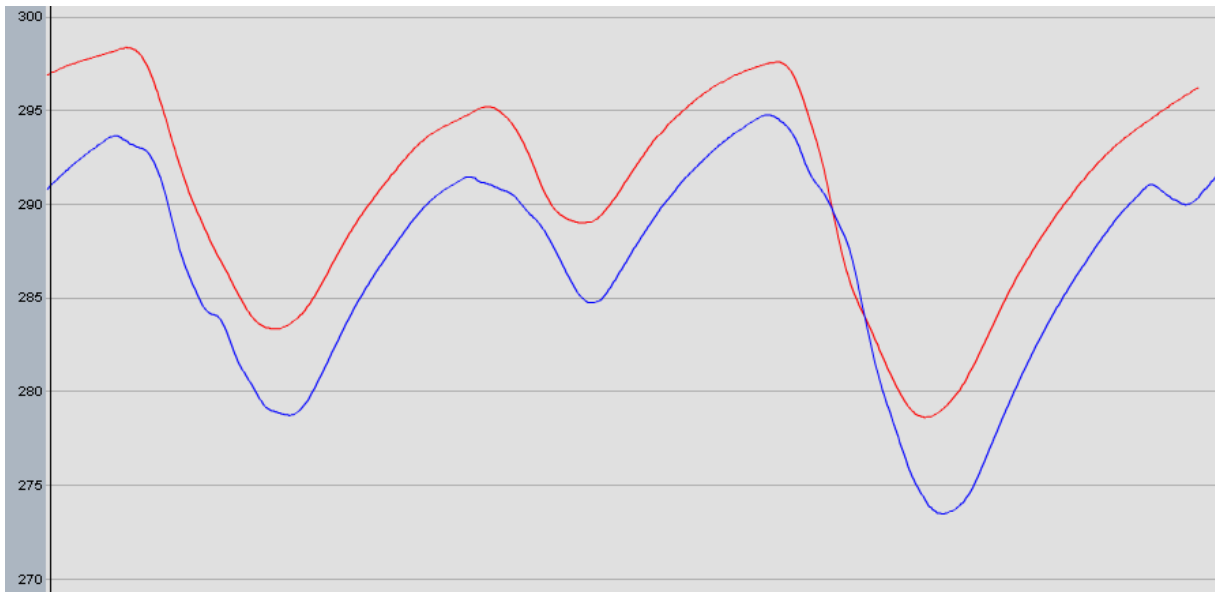
2014 KYOTO 500

# An unofficial Pre-race analysis [a must read for the motorsport connoisseur]

vom Gutholz

2014

First let's compare the world record lap to someone who never does any hotlapping. Speed and race line:

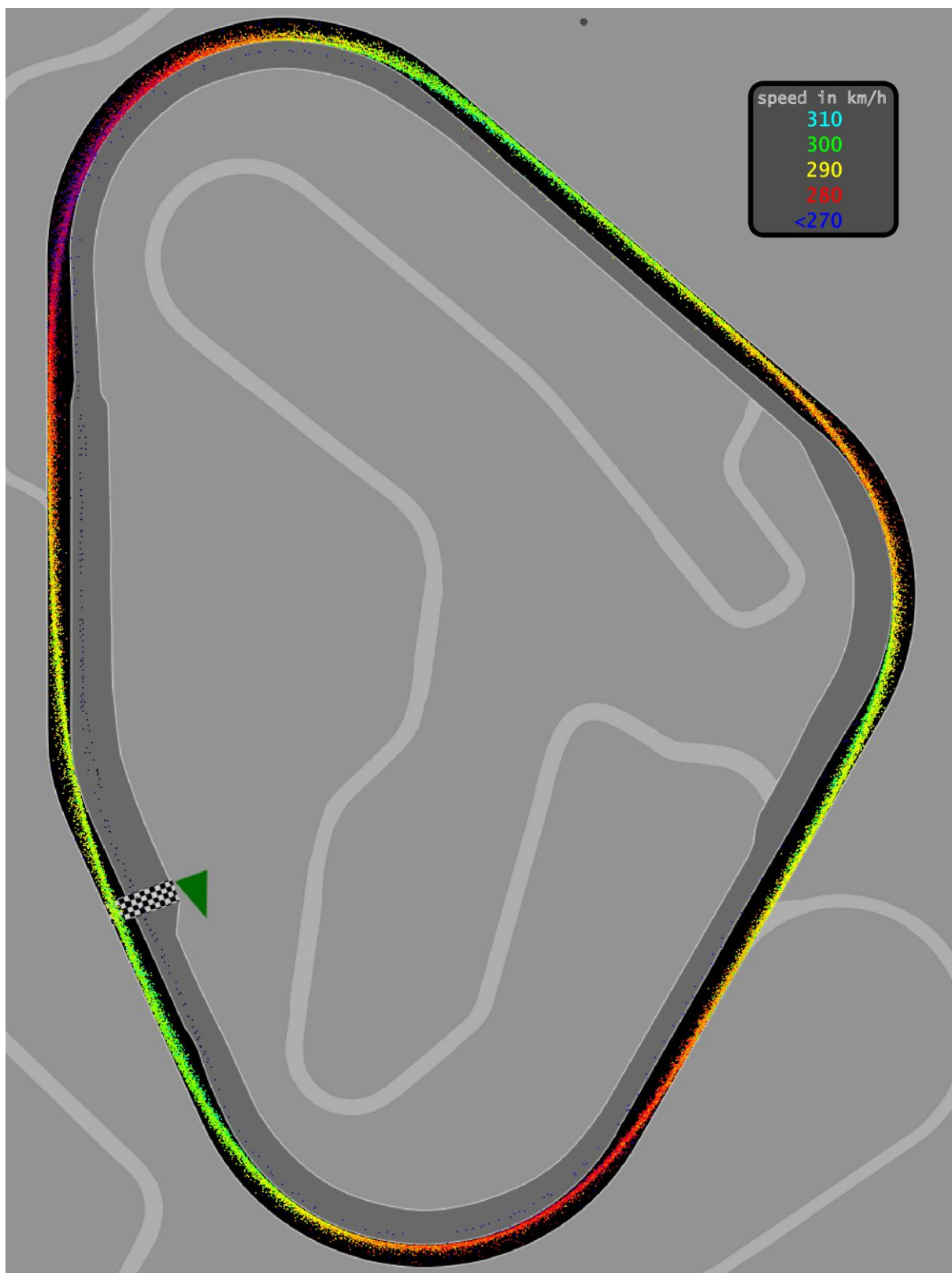


World record stands at 0:36:65 and is half a second faster per lap.

from <http://www.lfsworld.net/rafa/>

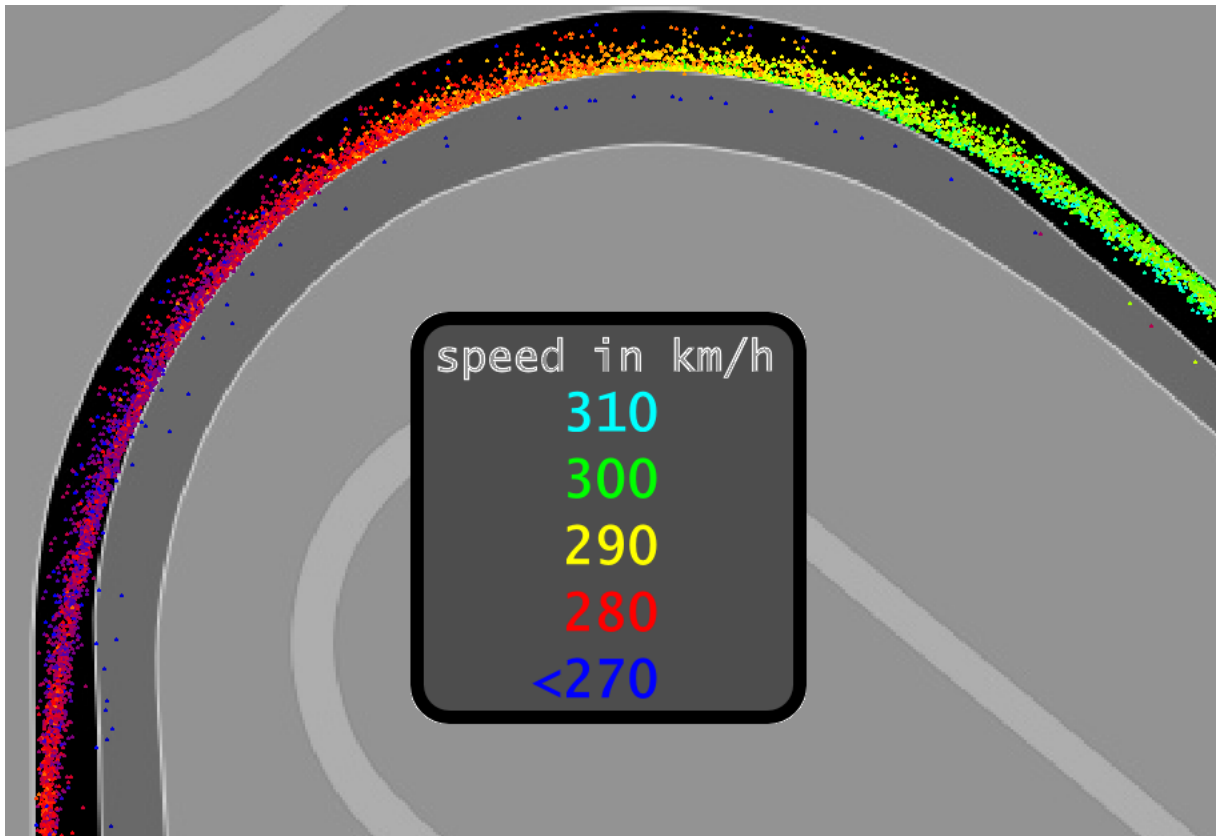
Hotlaps are pretty meaningless and boring though, so let's how things look in actual racing...

## Speed and Racing Line



Data from: Practice Saison 8 - pace laps filtered out, course cars not filtered out

Zoomed in Speed Map of Turn 3, the slowest corner:



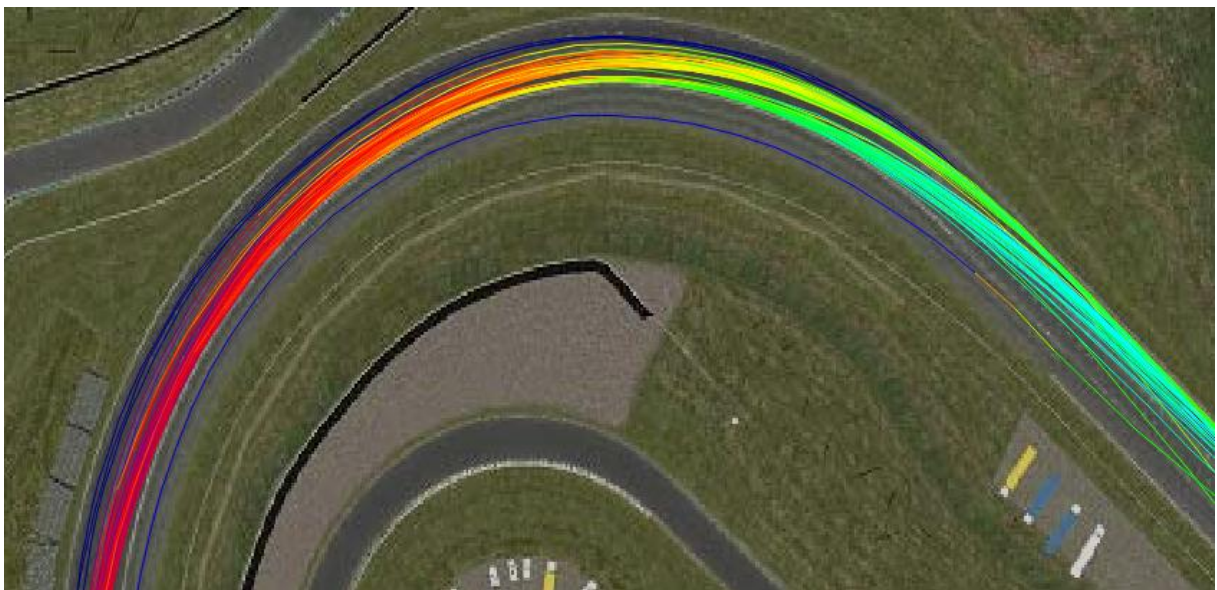
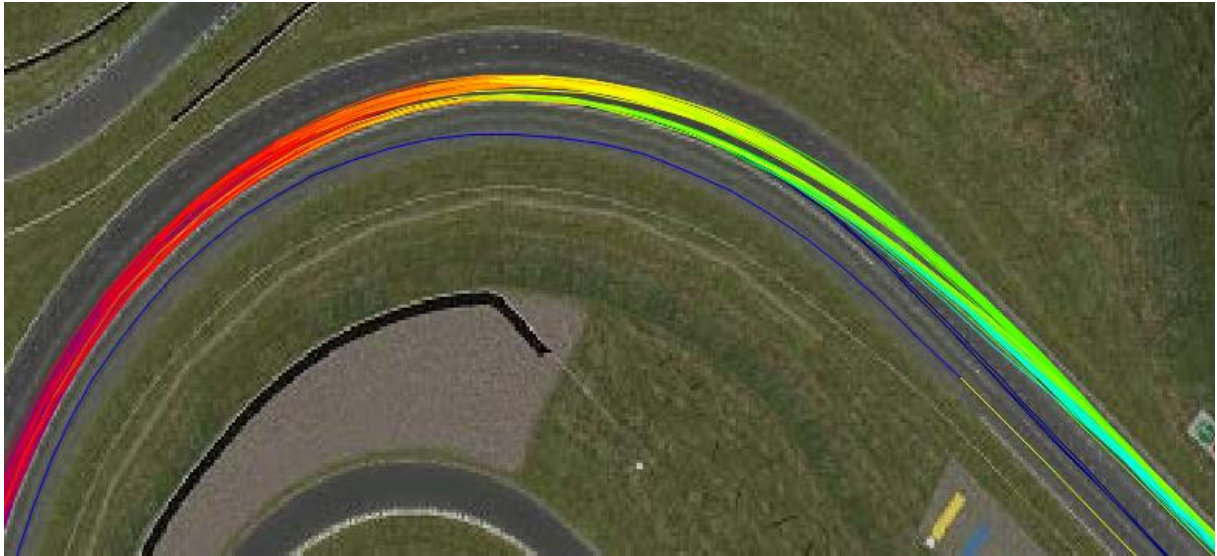
Despite never using the brakes, cars lose speed because of physics.  
Next up, a comparison between fast and slower drivers.

Speed Maps of individual cars.

**Note:** Pace laps included! (blue, slow lines)

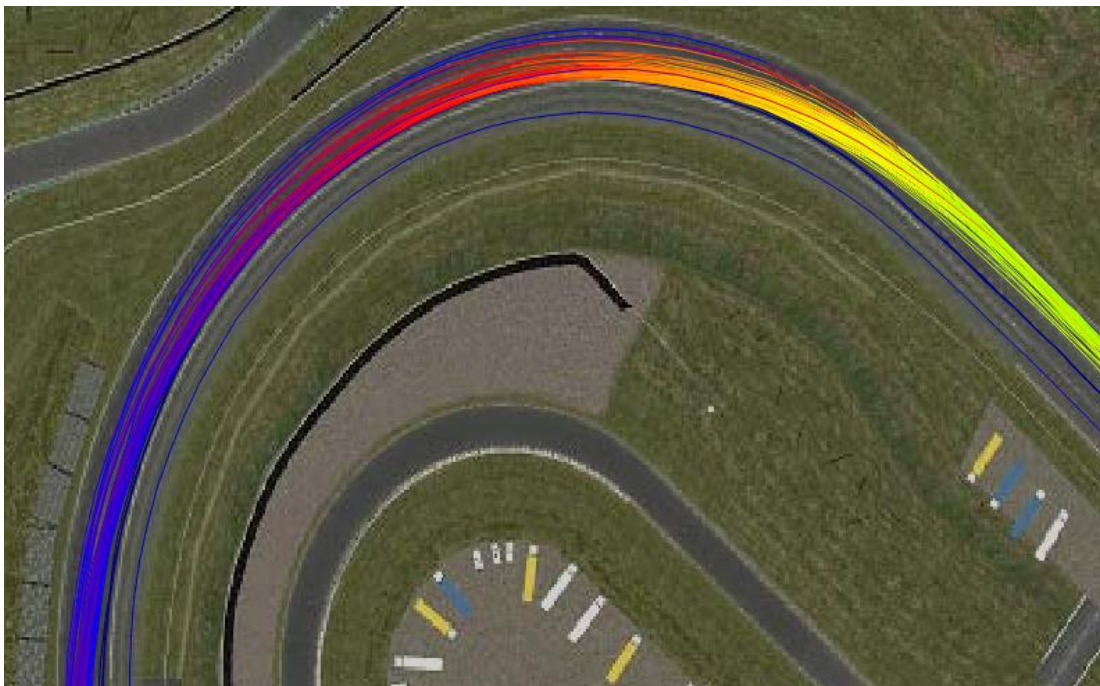
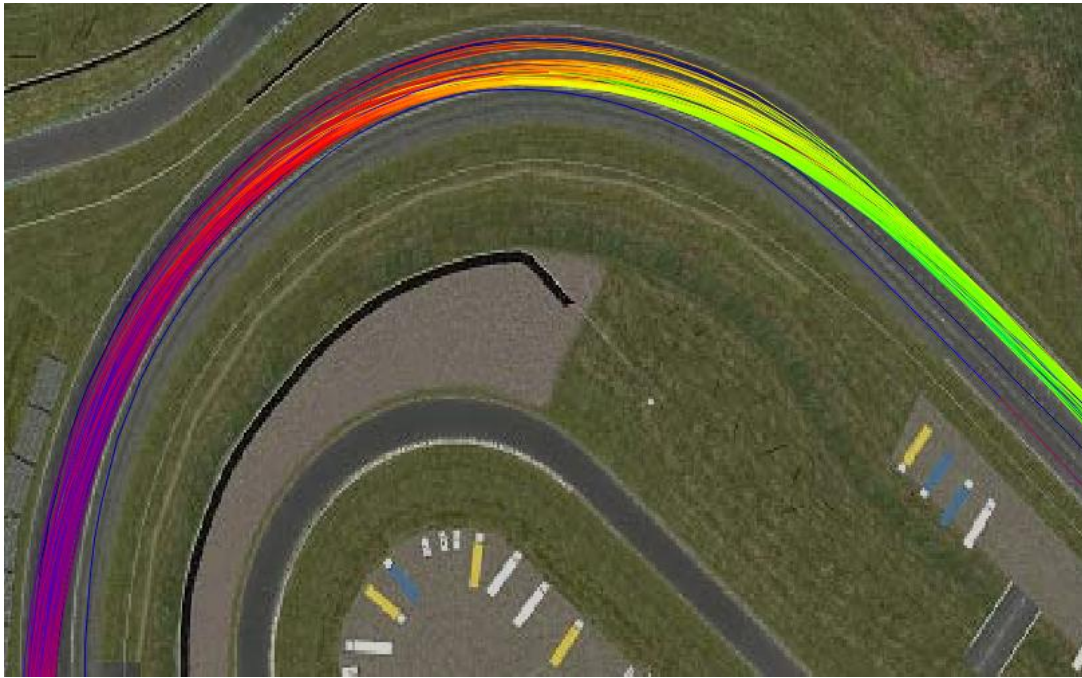
Data from Practice Saison 8

Two fast, experienced drivers:



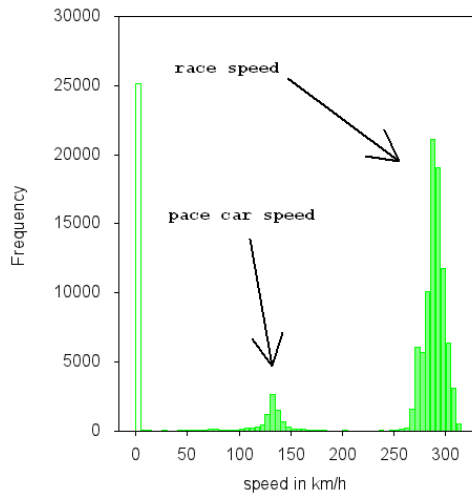
- Two clear paths on entry: Either high or low: depending if passing or letting another car pass
- Many teal lines indicate regular use of slipstream
- Normal pit entry lines

...compared to slower, less experienced (?) drivers:



- Paths are less clear: less exact driving or more fighting
- Speeds are lower overall, both on entry and during turn
- Less (or less effective) use of slipstream
- First car almost slides from pit lane apron back onto track (woops)

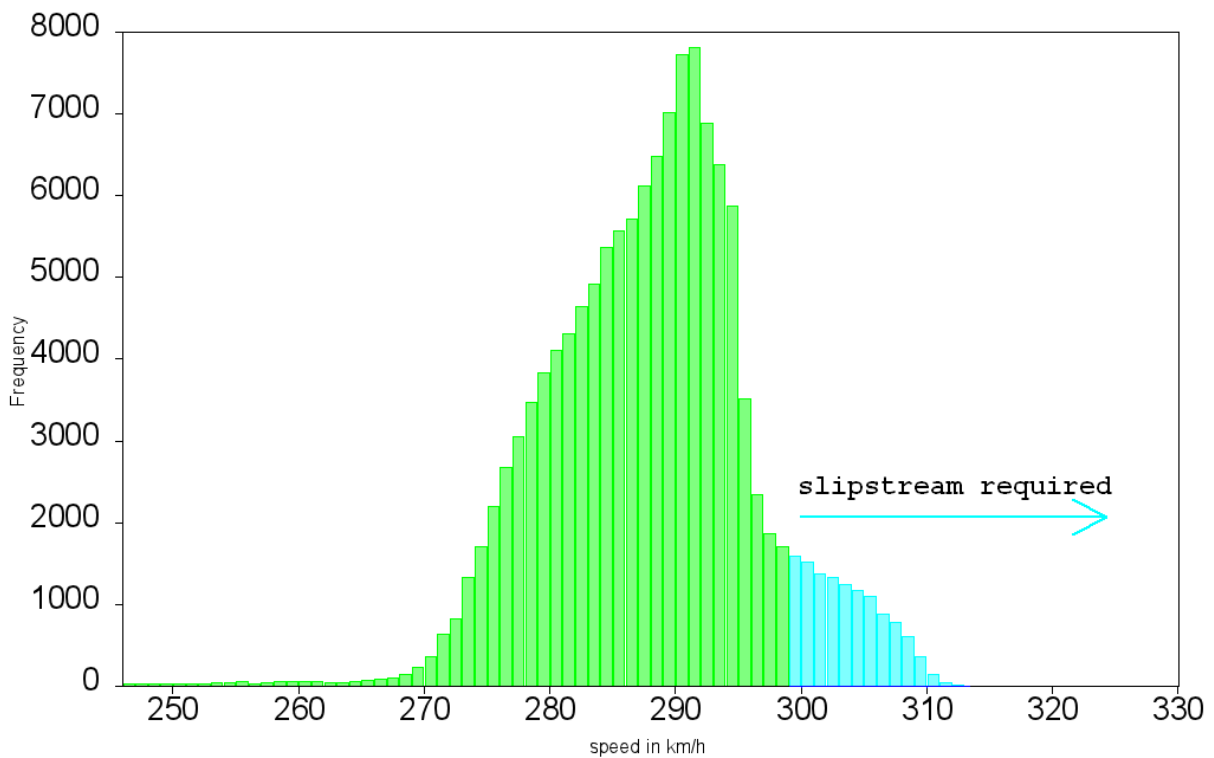
## Speed Histogram



“Frequency” refers to how much time cars spend driving with this speed.

As expected, most of the race is spent at very high speed.

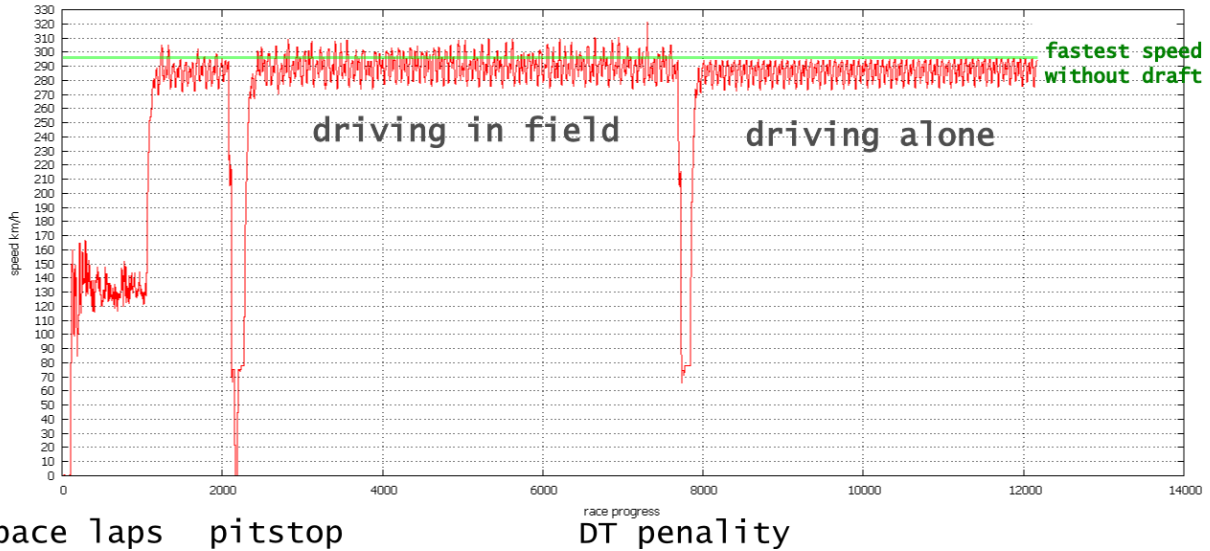
Crop & Zoom to interesting part:



Data from: Practice Saison 8

- Sharp drop-off after ~290 km/h: That is the fastest possible speed without slipstream.
- Slipstream adds another ~15-20 km/h but can not always be used effectively

# slipstream speed over race progress



Data from: Practice Saison 8 (full race)

Green line roughly indicates topspeed that a single car can reach. Dropping out of field without drafting partner means decrease of top and average speed.

# Two cars cooperating speed over race progress

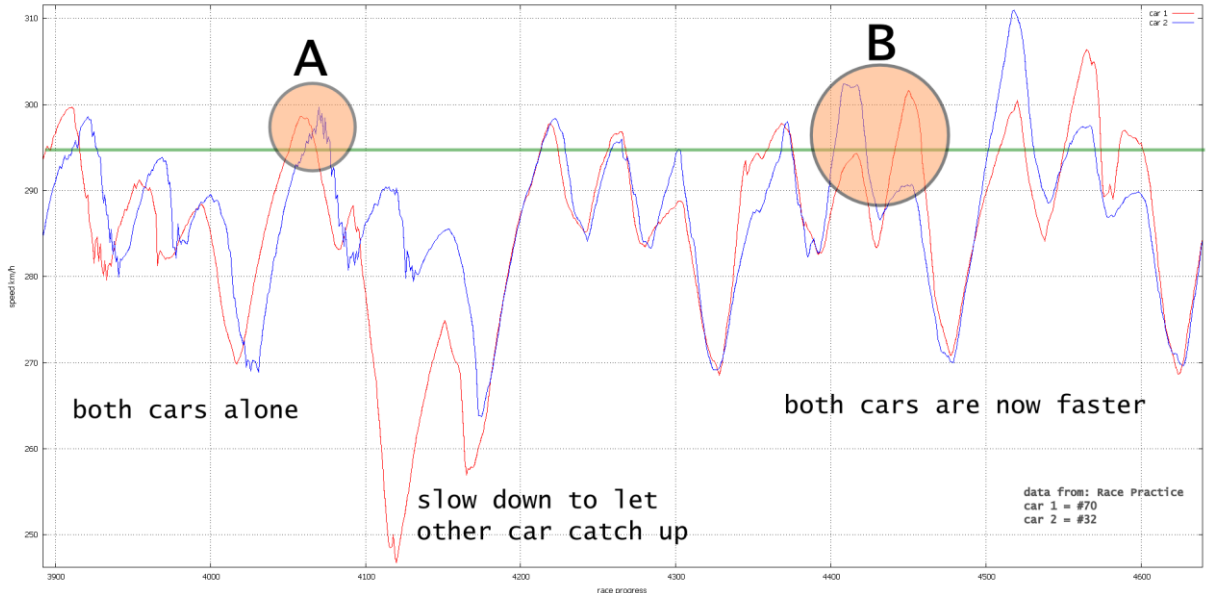


data from: Race Practice 2 car #70



Same situation as above, this time showing speed of both cars:

# single car vs two cars



Marked areas A and B:

- When both cars follow each other in some dozen meter distance, they reach their speed peaks at different times. We can see that the red line peaks earlier, so this car is ahead.
- When tandem-drafting, both cars speed peaks at the same time - but not to the same level.
- Since both cars take turns passing each other, so do the speed peaks
- Waiting on other cars to draft can be worthwhile if there are enough laps remaining

