Formula 1 accident calculations via Monte Carlo on first straight + turn

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1 Acceleration speed

"**0-100 kph** is a very tricky measure to be precise with, because the sheer amount of power makes it very difficult to get good traction and therefore know how fast a machine's been. The F1 car wants to spin up and the MotoGP bike just cannot keep the front wheel on the ground. However, at this point both machines perform alike, achieving a measure of around **2.6 seconds**.

0-200 kph is MotoGP territory. At around 180 kph the electronics take full control in the F1 car, while the MotoGP rider can still work on the throttle. The F1 does it in **5.2 seconds**, but it's 4.8s for the motorcycle.

0-300 kph. Here the MotoGP needs 11.8 seconds, but the single-seater just **10.6s**."
https://www.redbull.com/ca-en/motogp-repsol-honda-team-f1-red-bull-racing-2015

Example calculations:

v = $\frac{100kph}{3.6} = 27.77773ms$

a = $\frac{\Delta v}{\Delta t} = \frac{27.77773}{2.6} = 10.68372ms^2$

s = $\frac{1}{2}at^2 = \frac{1}{2} * 10.68372 * 2.6^2 = 36.11108m$

$36.11108m/2.6s = 13.88884m/s$

Onboard example start: https://www.youtube.com/watch?v=p$_l MtLdCjAI$

speed (kph)	time (s)	interval (s)	a (ms^2)	distance (1s)
0-100	2.6	2.6	10.68372	36.11108
0-200	5.2	2.6	10.68372	36.11108
0-300	10.6	5.4	5.14401	74.99951

1.1 Extra numbers (0-100 kph = 27.7777778 ms)

name	time (s)	a (ms^2)
Ferrari	2.48	11.20071
Mercedes	2.48	11.20071
Mercedes	2.68	10.36484
McLaren	2.8	9.92063
RedBull	2.84	9.78090

https://www.youtube.com/watch?v=zOhAIsLdRpk

2 Circuits

Nr.	Date	Circuit	Country	Turn	Pole	Distance	Brake	Gear	Speed
1	24-26 March	Albert Park Circuit	Australia	R	L	381m	100	4	150
2	7-9 April	Shanghai International Circuit	China	R	L	324.7	50	5	170
3	14-16 April	Bahrain International Circuit	Bahrain	R	L	476.4	100	2	70
4	28-30 April	Sochi International Street Circuit	Russia	R	R	205.2	-	8	300
5	12-14 May	Catalunya Circuit	Spain	R	L	690.5	100	3	130
6	25-28 May	Monaco Circuit	Monaco	R	R	111	75	3	103
7	9-11 June	Circuit Gilles Villeneuve	Canada	R	L	258	125	4	154
8	23-25 June	Baku street circuit	Azerbaijan	L	R	206	50	3	116
9	7-9 July	Red Bull Ring (A1-Ring)	Austria	R	L	318	200	3	122
10	14-16 July	Silverstone Circuit	Great Britain	R	L	270	-	8	281
11	28-30 July	Hungaroring	Hungary	R	L	576	100	2	85
12	25-27 Aug	Spa Francorchamps Circuit	Belgium	R	L	251	150	3	77
13	1-3 Sep	Autodromo Nazionale Monza	Italy	R	L	615	125	2	80
14	15-17 Sep	Singapore Circuit	Singapore	L	L	274	50	4	126
15	29 Sep 1 Okt	Sepang International Circuit	Malaysia	R	L	620	100	2	74
16	6-8 Oct	Suzuka Circuit	Japan	R	L	373	10	7	134
17	20-22 Oct	Circuit of The Americas	USA	L	R	364	100	2	86
18	27-29 Oct	Autodromo Hermanos Rodriguez	Mexico	R	L	890	200	3	107
19	10-12 Nov	Autodromo Interlagos	Brazil	L	R	334	50	3	109
20	24-26 Nov	Yas Marina Circuit	UAE	L	R	305	50	3	150

2.1 Circuit information

7.3 Width When planning new permanent circuits, the track width foreseen should be at least 12 m. Where the track width changes, the transition should be made as gradually as possible, at a rate not greater than 1 m in 20 m total width. The width of the starting grid should be at least 15 m; this width must be maintained through to the exit of the rst corner (as indicated by the racing line).

appendix_o_-_procedures_for_the_recognition_of_motor_racing_circuits_-_2017.pdf

35.4 The grid will be in a staggered 1 x 1 formation and the rows on the grid will be separated by 16 metres.

4._formula_one_-_sporting_*regulations*_–_2017.*pdf*

2.2 Links: (Virtual) Circuit guide's & Birds Eye Views

1	https://www.youtube.com/watch?v=h6KqNHLD-Ro	https://www.youtube.com/v
2	https://www.youtube.com/watch?v=mVlRAJEJedc	https://www.youtube.com/v
3	https://www.youtube.com/watch?v=Dl3Ua-PwlJ8	https://www.youtube.com/v
4	https://www.youtube.com/watch?v=8v5nWH5hC68	https://www.youtube.com/v
5	https://www.youtube.com/watch?v=upE6lOvOuRo	https://www.youtube.com/v
6	https://www.f1fanatic.co.uk/f1-information/going-to-a-race/monte-carlo-circuit-information/	https://www.youtube.com/v
7	https://www.youtube.com/watch?v=nhiWtGP38k0	https://www.youtube.com/v
8	https://www.youtube.com/watch?v=GONa9mfmhzo	https://www.youtube.com/v
9	https://www.youtube.com/watch?v=V48O2eYgxQ4	https://www.youtube.com/v
10	https://www.youtube.com/watch?v=QVkN3z33HBM	https://www.youtube.com/v
11	https://www.youtube.com/watch?v=-yj44ATHoYs	https://www.youtube.com/v
12	https://www.youtube.com/watch?v=jrRQgO1g9Bs	https://www.youtube.com/v
13	https://www.youtube.com/watch?v=KvzTBeBMy5s	https://www.youtube.com/v
14	https://www.youtube.com/watch?v=93L5lbDa2ig	https://www.youtube.com/v
15	https://www.youtube.com/watch?v=3s76rtsS8sg	https://www.youtube.com/v
16	https://www.youtube.com/watch?v=01JljU8rGkg	https://www.youtube.com/v
17	https://www.youtube.com/watch?v=N1C4sTUZzKo (2016)	https://www.f1fanatic.co.uk
18	https://www.youtube.com/watch?v=9pK6Cufuel0 (2016)	https://www.f1fanatic.co.uk
19	https://www.youtube.com/watch?v=LAV9TlKIzK8 (2016)	https://www.f1fanatic.co.uk
20	https://www.youtube.com/watch?v=LAXWZbSp0z4 (2016)	https://www.f1fanatic.co.uk

2.3 Accidents

Nr.	Turn width	Link	Accidents 1st straight/turn
1	2	https://www.youtube.com/watch?v=R3cfJCOSq8Q	-
2	2	https://www.youtube.com/watch?v=MFH38CL1Ots	-
3	2	https://www.youtube.com/watch?v=6yXvIbKXehw	-
4	3	https://www.youtube.com/watch?v=xtHtegExhXY	-
5	3	https://www.youtube.com/watch?v=KS2BUVrDNTI	touch resulting in stops
6	2	https://www.youtube.com/watch?v=MzQ8CzXRO8A	-
7	2	https://www.youtube.com/watch?v=YwL19BaHY2w	touch
8	2	https://www.youtube.com/watch?v=zP3WOVR1-YU	spin
9	2	https://www.youtube.com/watch?v=uTg4XAiAnh8	crash
10	2	https://www.youtube.com/watch?v=t0WHNqwDjXc	-
11	3	https://www.youtube.com/watch?v=pU72heP0uH0	touch
12	2	https://www.youtube.com/watch?v=rhmGaCjpoBY	-
13	2	https://www.youtube.com/watch?v=1LOPzsVsaA0	grass
14	2	https://www.youtube.com/watch?v=wAOMOmsqpUY	crash
15	3	https://www.youtube.com/watch?v=02ekLWzzU5s	little touch
16	2	https://www.youtube.com/watch?v=F4T97cQm2iE	touch

3 Car + behaviour

3.1 Overtaking

20.4 Any driver defending his position on a straight, and before any braking area, may use the full width of the track during his first move, provided no significant portion of the car attempting to pass is alongside his. Whilst defending in this way the driver may not leave the track without justifiable reason.

20.3 More than one change of direction to defend a position is not permitted.
https://f1metrics.wordpress.com/2014/08/28/the-rules-of-racing/

3.2 Car

3.2.2 Width. The overall width of the car, excluding tyres, must not exceed 2000mm with the steered wheels in the straight ahead position.
3._formula_one_-_technical_regulations_-_2017.pdf

Length: +- 5000mm https://www.f1technical.net/forum/viewtopic.php?t=25999
Change "lanes"; approximately 2 (max) per second