Suspension Anti-Dive and Anti-Squat Percentage

Front anti-dive under braking and rear anti-squat under acceleration from side-view swing arm geometry, CG height, wheelbase and the front share of braking.

Method: Side-view swing arm geometry

Input parameters

Unit system: SI

Parameter	Value	Unit
Front side-view instant centre height	120.00	mm
Front instant centre distance (rearward)	1.8000	m
Rear instant centre height	200.00	mm
Rear instant centre distance (forward)	1.6000	m
Wheelbase	2.7000	m
CG height	550.00	mm
Front share of braking	70.000	%

Calculated results

Parameter	Value	Unit
Front anti-dive	22.909	%
Rear anti-squat (driven rear axle)	61.364	%

Notes for this case

• Outboard brakes: anti-dive = tanθ_f·(L/h)·β_f with tanθ_f = e_f/d_f; independent rear drive with outboard reaction: anti-squat = tanθ_r·L/h. 100 % means no pitch from the longitudinal load transfer. Road cars use modest values (about 10–40 %) because high anti-dive harshens braking over bumps.

Formula and method

$$AD = \frac{e_f}{d_f}\frac{L}{h}\beta_f, \quad AS = \frac{e_r}{d_r}\frac{L}{h}$$

Variables

e_f	Front side-view instant centre height	m
d_f	Front instant centre distance (rearward)	m
e_r	Rear instant centre height	m
d_r	Rear instant centre distance (forward)	m
L	Wheelbase	m
h	CG height	m
β_f	Front share of braking	-
AD	Front anti-dive	-
AS	Rear anti-squat (driven rear axle)	-

Method and standards

Anti-features.

Assumptions and limits

- Outboard brakes; rear-wheel drive with independent suspension; small motions.

References

Side-view swing arm geometry

Report details

Report reference	FCC-C00V-HZRN (the same inputs always give the same reference)
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Calculator	Suspension Anti-Dive and Anti-Squat Percentage
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Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/automotive/vehicle-dynamics/anti-dive-anti-squat

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.