MARS MIDWEST ACCIDENT RECONSTRUCTION SERVICES

STEADY-STATE HANDLING CALCULATIONS
2-degree-of-freedom bicycle model

See SAE 2012-01-0242 for more details

Car= 1996 Chevrolet Corvette

vehicle-specific value supplied by user

value calculated by speadsheet

See SAE 2012-01-0242 for more details

Front axle is leading axle unless the vehicle is going backwards

	U.S. 1		U.S. 2		S.I.	
b=	43.68	in	3.64	ft	1.11	meters
c=	52.52	in	4.38	ft	1.33	meters
L=	96.20	in	8.02	ft	2.44	meters
Cf=	308.07	lbf/deg			1370.30	N/deg
Cr=	308.07	lbf/deg			1370.30	N/deg
W=	3404.00	lbf			15140.99	N
Wf=	1872.20	lbf			8327.55	N
Wr=	1531.80	lbf			6813.45	N
leading axle track/2=	29.80	in	2.48	ft	0.76	meters
trailing axle track/2=	30.20	in	2.52	ft	0.77	meters
leading axle tire width=	275.00	mm	0.90	ft	0.28	meters
trailing axle tire width=	275.00	mm	0.90	ft	0.28	meters
u=	50.00	mph	73.33	ft/sec	22.35	m/sec
R=	200.00	ft			60.96	m

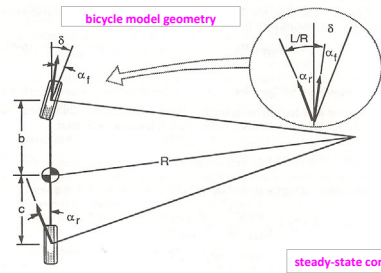
	U.S. 1		U.S. 2		S.I.	
Ackermann steer angle L/R=	2.30	deg				
lateral acceleration=	26.89	ft/sec^2	0.84	g	8.19	m/sec^2
front tire slip angle=	5.08	deg				
rear tire slip angle=	4.16	deg				
steer angle at tire=	3.22	deg				
body angle beta=	-2.90	deg				
tangent speed=	40.28	ft/sec	27.46	mph	12.28	m/sec
critical speed=	#NUM!	ft/sec	#NUM!	mph	#NUM!	m/sec
characteristic speed=	115.65	ft/sec	78.85	mph	35.25	m/sec
static margin=	0.05	ft			0.01	m
neutral steer point=	0.50	ft			0.15	m
understeer gradient K=	1.10	deg/g			0.34	deg/g

** exists only for OS car

STABILITY DERIVATIVES

Y sub-beta =	-616.14
Y sub-r =	3.09
Y sub-delta =	308.07
N sub-beta =	226.94
N sub-r =	136.13
N sub-delta =	-1121.37

bicycle model geometry



steady-state cornering characteristics

	U.S.1		U.S. 2		S.I.	
bicycle rear tire radius=	199.83	ft			60.91	m
bicycle front tire radius=	200.22	ft			61.03	m
outside rear tire radius=	202.34	ft	2428.11	inches	61.67	m
inside rear tire radius=	197.31	ft	2367.71	inches	60.14	m
outside front tire radius=	202.70	ft	2432.41	inches	61.78	m
inside front tire radius=	197.73	ft	2372.81	inches	60.27	m
bicycle model tire overlap=	0.51	ft	6.13	inches	155.80	mm
bicycle model % tire overlap=	56.66	percent				
trailing axle track width/2 or TAW	2.52	ft	30.20	inches	767.08	mm
leading axle track width/2 or LAW	2.48	ft	29.80	inches	756.92	mm
tire width on trailing axle or TTW	0.90	ft	10.83	inches	275.00	mm
tire width on leading axle or LTW	0.90	ft	10.83	inches	275.00	mm
Point 1	2.03	ft	24.39	inches	619.42	mm
Point 2	2.93	ft	35.21	inches	894.42	mm
Point 3	2.07	ft	24.79	inches	629.58	mm
Point 4	2.97	ft	35.61	inches	904.58	mm