TreadSim

The physical brush tire model is described in Section 3.2 of the book. The tread simulation model outlined in Section 3.3 allows the calculation of the horizontal forces, F_x and F_y and the aligning torque M_z as well as the pneumatic trail t as steady state responses to slip angle α, longitudinal slip κ and turn slip φ_t. The quantities α, κ, φ_t or the camber angle γ may serve as parameter producing several curves in the graph.

The simulation model has been programmed in MATLAB.

To reproduce a graph of FIGURES 3.35(a,b,c,d) and 3.36 we need to use a correct set of parameter values to be applied in the script TreadSim.m.

Table lists the required sets of parameter values per graph desired.

FIGURE 3.35(a)														
Graph	MatLab Figure	rigid	n row	aμ/ 0.03	M max	M min	γ deg	κ runs	α runs	aφ$_t$ runs	κ par	α par	γ par	aφ$_t$ par
1,2	(1),(3)	1	1	0	50	-50	0	0	1	0	1	0	0	0
3,4	(5),(6)	1	1	0	50	-50	0	1	0	0	0	1	0	0
5,6	(1),(3)	1	1	1	50	-50	0	0	1	0	1	0	0	0
7,8	(5),(6)	1	1	1	50	-50	0	1	0	0	0	1	0	0
FIGURE 3.35(b)														
1,2	(1),(3)	0	1	1	50	-50	0	0	1	0	1	0	0	0
3,4	(5),(6)	0	1	1	50	-50	0	1	0	0	0	1	0	0
5	(1)	0	1	1	50	-50	10	0	1	0	1	0	0	0
6,7,8	(1),(5),(6)	0	1	1	200	-200	10	1	0	0	0	1	0	0
FIGURE 3.35(c)														
1,2	(5),(6)	0	2	1	200	-200	10	1	0	0	0	1	0	0
3,4	(1),(3)	0	2	1	200	-200	0	0	1	0	0	0	1	0
5	(1)	0	2	1	50	-50	0	0	1	0	1	0	0	0
6,7,8	(1),(5),(6)	0	2	1	50	-50	0	1	0	0	0	1	0	0
FIGURE 3.35(d)														
1,2	(1),(3)	0	2	1	200	-200	0	0	1	0	0	0	0	1
3,4	(1),(3)	0	2	0	200	-200	0	0	1	0	0	0	0	1
5,6	(1),(3)	0	2	0	200	-50	0	0	0	1	0	1	0	0
FIGURE 3.36														
1	(4)	0	2	0	200	-200	0	0	1	0	0	0	0	0
2	(4)	1	1	0	200	-200	0	0	1	0	0	0	0	0