PM Fan and Oblique Shock Tables

Source: Aerodynamics for Engineers, Bertin & Smith

TABLE 8.2 MACH NUMBER AND MACH ANGLE AS A FUNCTION OF PRANDTL–MEYER ANGLE

ν (deg)	M	μ (deg)	ν (deg)	M	μ (deg)
0.0	1.000	90.000	22.5	1.862	32.488
0.5	1.051	72.099	23.0	1.879	32.148
1.0	1.082	67.574	23.5	1.897	31.814
1.5	1.108	64.451	24.0	1.915	31.486
2.0	1.133	61.997	24.5	1.932	31.164
2.5	1.155	59.950	25.0	1.950	30.847
3.0	1.177	58.180	25.5	1.968	30.536
3.5	1.198	56.614	26.0	1.986	30.229
4.0	1.218	55.205	26.5	2.004	29.928
4.5	1.237	53.920	27.0	2.023	29.632
5.0	1.256	52.738	27.5	2.041	29.340
5.5	1.275	51.642	28.0	2.059	29.052
6.0	1.294	50.619	28.5	2.078	28.769
6.5	1.312	49.658	29.0	2.096	28.491
7.0	1.330	48.753	29.5	2.115	28.216
7.5	1.348	47.896	30.0	2.134	27.945
8.0	1.366	47.082	30.5	2.153	27.678
8.5	1.383	46.306	31.0	2.172	27.415
9.0	1.400	45.566	31.5	2.191	27.155
9.5	1.418	44.857	32.0	2.210	26.899
10.0	1.435	44.177	32.5	2.230	26.646
10.5	1.452	43.523	33.0	2.249	26.397
11.0	1.469	42.894	33.5	2.269	26.151
11.5	1.486	42.287	34.0	2.289	25.908
12.0	1.503	41.701	34.5	2.309	25.668
12.5	1.520	41.134	35.0	2.329	25.430
13.0	1.537	40.585	35.5	2.349	25.196
13.5	1.554	40.053	36.0	2.369	24.965
14.0	1.571	39.537	36.5	2.390	24.736
14.5	1.588	39.035	37.0	2.410	24.510
15.0	1.605	38.547	37.5	2.431	24.287
15.5	1.622	38.073	38.0	2.452	24.066
16.0	1.639	37.611	38.5	2.473	23.847
16.5	1.655	37.160	39.0	2.495	23.631
17.0	1.672	36.721	39.5	2.516	23.418
17.5	1.689	36.293	40.0	2.538	23.206
18.0	1.706	35.874	40.5	2.560	22.997
18.5	1.724	35.465	41.0	2.582	22.790
19.0	1.741	35.065	41.5	2.604	22.585
19.5	1.758	34.673	42.0	2.626	22.382
20.0	1.775	34.290	42.5	2.649	22.182
20.5	1.792	33.915	43.0	2.671	21.983
21.0	1.810	33.548	43.5	2.694	21.786
21.5	1.827	33.188	44.0	2.718	21.591
22.0	1.844	32.834	44.5	2.741	21.398

TABLE 8.2 *(Continued)*

ν (deg)	M	μ (deg)	ν (deg)	M	μ (deg)
45.0	2.764	21.207	67.5	4.133	14.002
45.5	2.788	21.017	68.0	4.173	13.865
46.0	2.812	20.830	68.5	4.214	13.729
46.5	2.836	20.644	69.0	4.255	13.593
47.0	2.861	20.459	69.5	4.297	13.459
47.5	2.886	20.277	70.0	4.339	13.325
48.0	2.910	20.096	70.5	4.382	13.191
48.5	2.936	19.916	71.0	4.426	13.059
49.0	2.961	19.738	71.5	4.470	12.927
49.5	2.987	15.561	72.0	4.515	12.795
50.0	3.013	19.386	72.5	4.561	12.665
50.5	3.039	19.213	73.0	4.608	12.535
51.0	3.065	19.041	73.5	4.655	12.406
51.5	3.092	18.870	74.0	4.703	12.277
52.0	3.119	18.701	74.5	4.752	12.149
52.5	3.146	18.532	75.0	4.801	12.021
53.0	3.174	18.366	75.5	4.852	11.894
53.5	3.202	18.200	76.0	4.903	11.768
54.0	3.230	18.036	76.5	4.955	11.642
54.5	3.258	17.873	77.0	5.009	11.517
55.0	3.287	17.711	77.5	5.063	11.392
55.5	3.316	17.551	78.0	5.118	11.268
56.0	3.346	17.391	78.5	5.175	11.145
56.5	3.375	17.233	79.0	5.231	11.022
57.0	3.406	17.076	79.5	5.289	10.899
57.5	3.436	16.920	80.0	5.348	10.777
58.0	3.467	16.765	80.5	5.408	10.656
58.5	3.498	16.611	81.0	5.470	10.535
59.0	3.530	16.458	81.5	5.532	10.414
59.5	3.562	16.306	82.0	5.596	10.294
60.0	3.594	16.155	82.5	5.661	10.175
60.5	3.627	16.006	83.0	5.727	10.056
61.0	3.660	15.856	83.5	5.795	9.937
61.5	3.694	15.708	84.0	5.864	9.819
62.0	3.728	15.561	84.5	5.935	9.701
62.5	3.762	15.415	85.0	6.006	9.584
63.0	3.797	15.270	85.5	6.080	9.467
63.5	3.832	15.126	86.0	6.155	9.350
64.0	3.868	14.983	86.5	6.232	9.234
64.5	3.904	14.840	87.0	6.310	9.119
65.0	3.941	14.698	87.5	6.390	9.003
65.5	3.979	14.557	88.0	6.472	8.888
66.0	4.016	14.417	88.5	6.556	8.774
66.5	4.055	14.278	89.0	6.642	8.660
67.0	4.094	14.140	89.5	6.729	8.546

Oblique 2D Shock

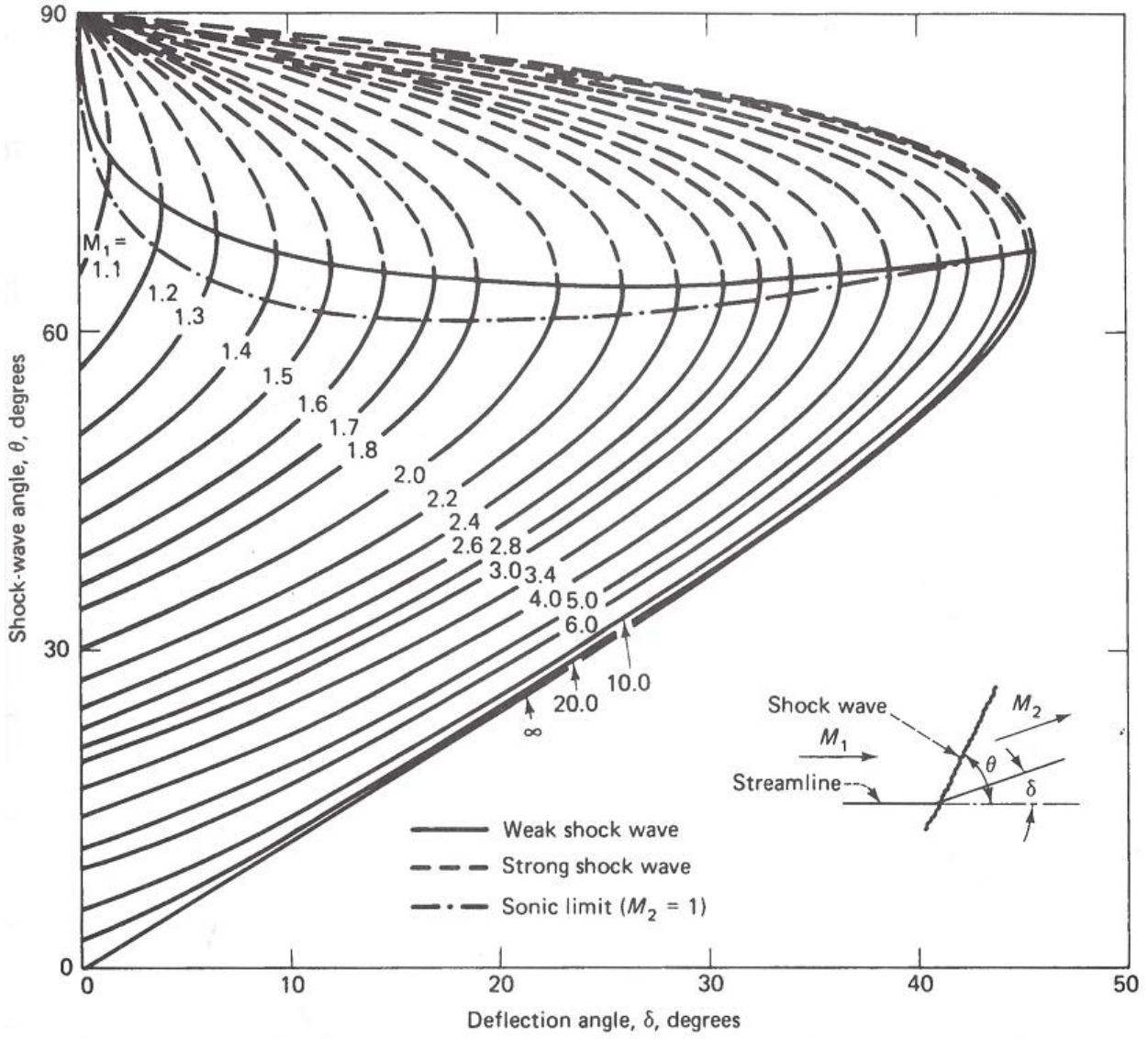
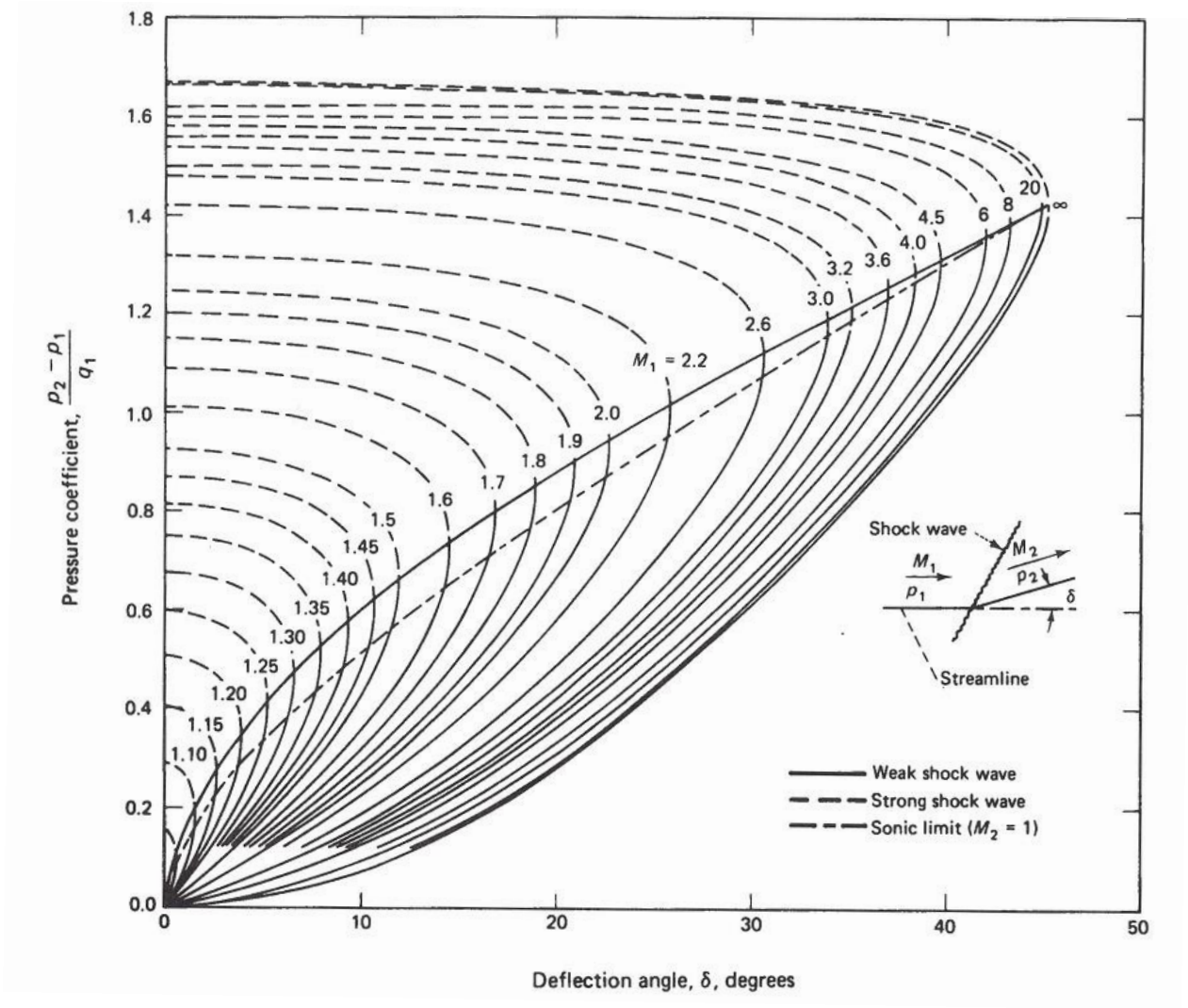


Figure 8.13 Variation of shock-wave parameters with wedge flow-deflection angle for various upstream Mach numbers, $\gamma = 1.4$: (a) shock-wave angle.


Pressure coefficient, $\frac{p_2 - p_1}{q_1}$
Deflection angle, δ, degrees
M_1 = 2.2
1.10
1.15
1.20
1.25
1.30
1.35
1.40
1.45
1.5
1.6
1.7
1.8
1.9
2.0
2.6
3.0
3.2
3.6
4.0
4.5
6
8
20
∞
Shock wave
M_1
p_1
M_2
p_2
δ
Streamline
Weak shock wave
Strong shock wave
Sonic limit (M_2 = 1)

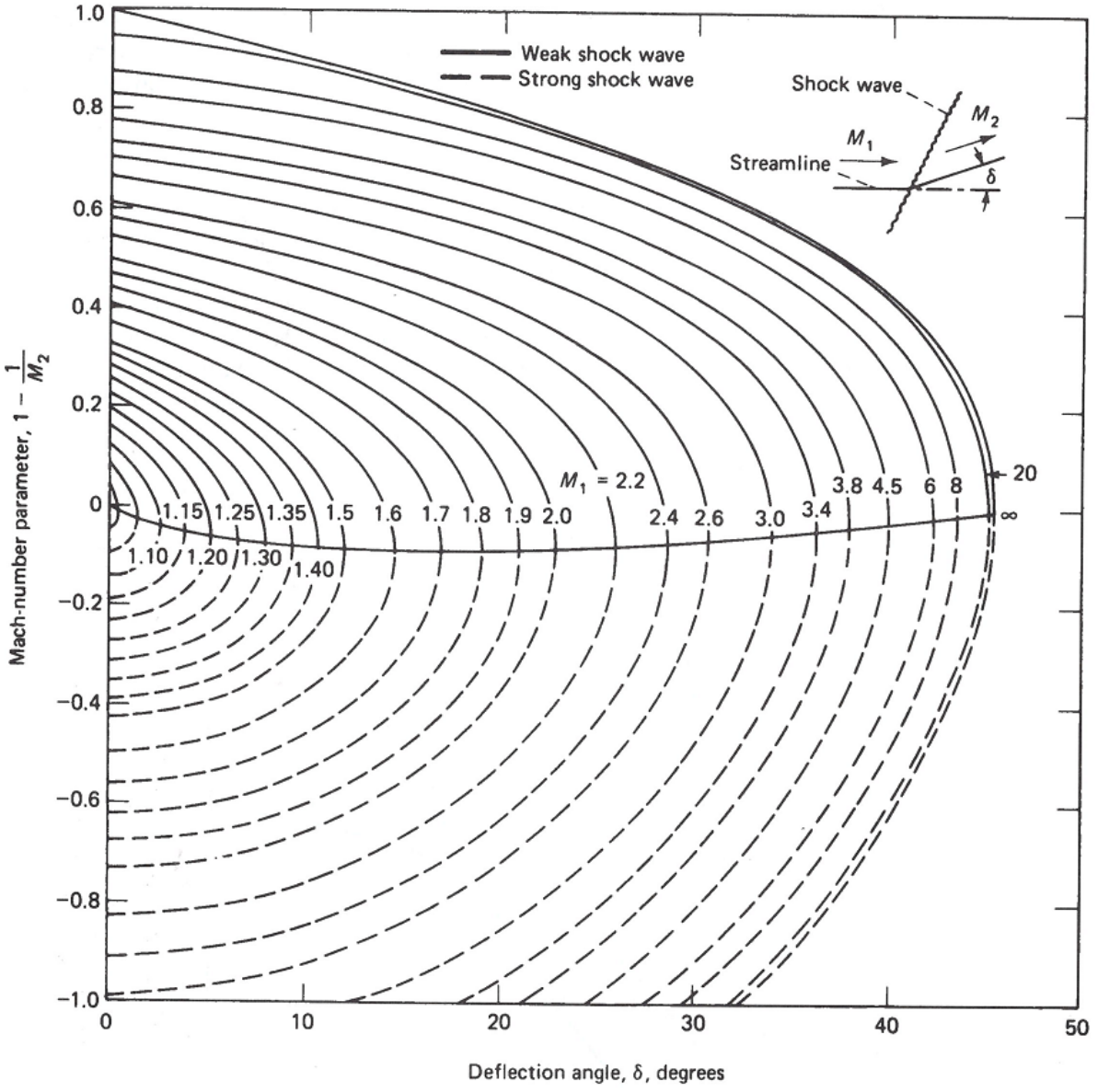


Figure 8.13 *(Continued)* (c) downstream Mach number.

Conical Shock

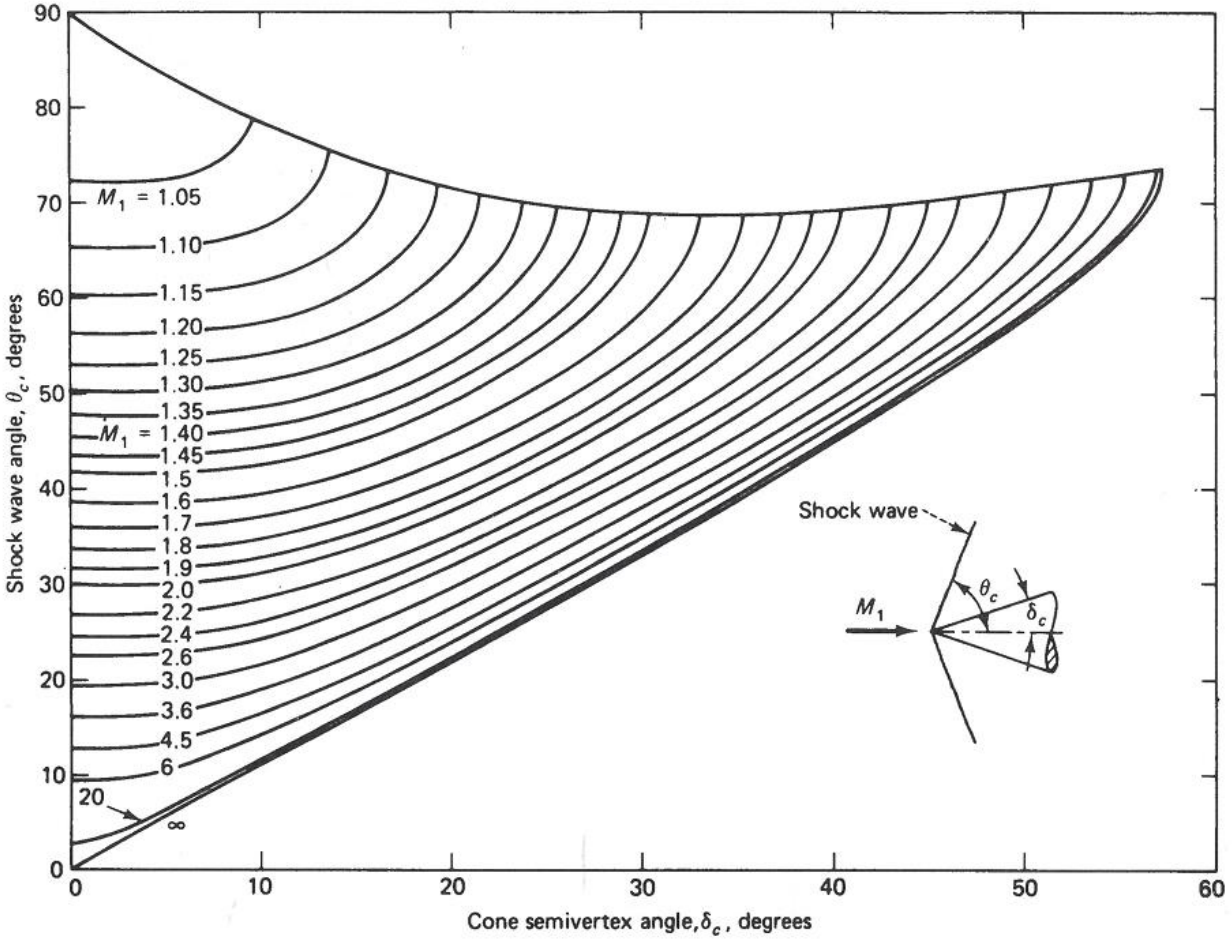


Figure 8.16 Variations of shock-wave parameters with cone semivertex angle for various upstream Mach numbers, $\gamma = 1.4$: (a) shock-wave angle.

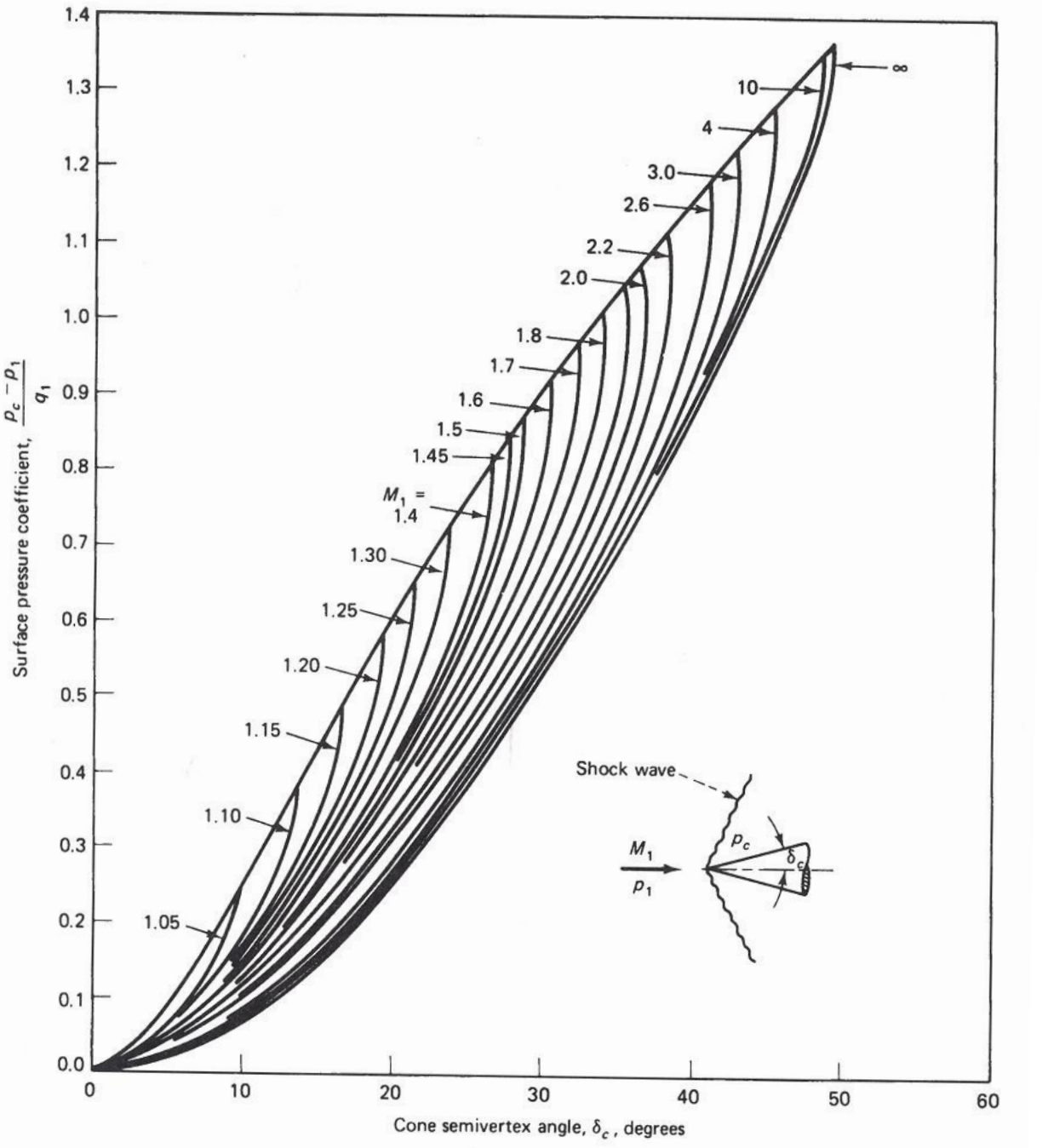


Figure 8.16 *(continued)* (b) pressure coefficient.

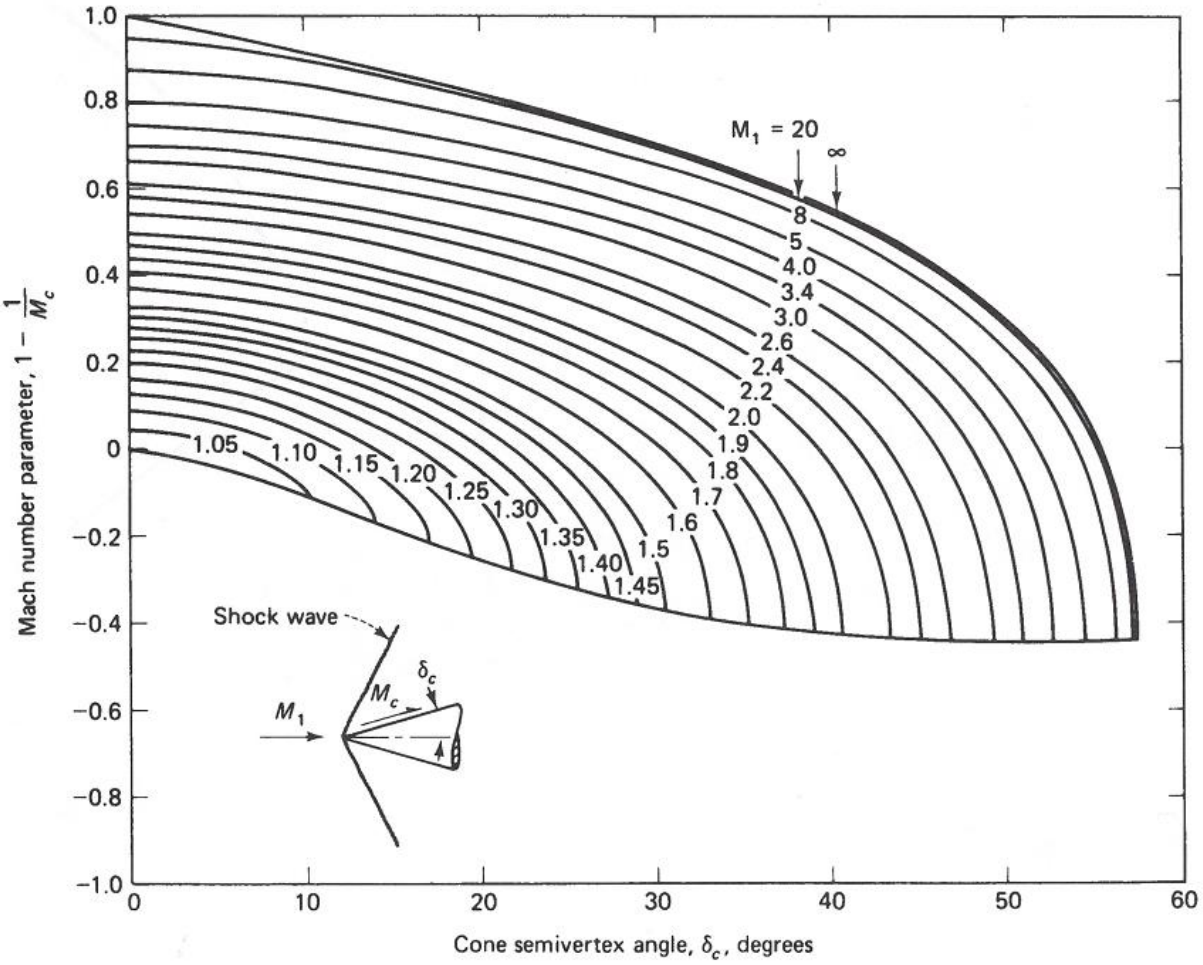


Figure 8.16 *(continued)* (c) Mach number on the surface of the cone.