

Table E.1: Rayleigh flow properties for  $\gamma = 1.4$ 

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
0.02	0.0023	2.3987	1042.2500	0.0019	1.2675
0.04	0.0092	2.3946	261.0000	0.0076	1.2665
0.06	0.0205	2.3880	116.3241	0.0171	1.2647
0.08	0.0362	2.3787	65.6875	0.0302	1.2623
0.10	0.0560	2.3669	42.2500	0.0468	1.2591
-	-	-	-	-	-
0.12	0.0797	2.3526	29.5185	0.0666	1.2554
0.14	0.1069	2.3359	21.8418	0.0895	1.2510
0.16	0.1374	2.3170	16.8594	0.1151	1.2461
0.18	0.1708	2.2959	13.4434	0.1432	1.2406
0.20	0.2066	2.2727	11.0000	0.1736	1.2346
-	-	-	-	-	-
0.22	0.2445	2.2477	9.1921	0.2057	1.2281
0.24	0.2841	2.2209	7.8171	0.2395	1.2213
0.26	0.3250	2.1925	6.7470	0.2745	1.2140
0.28	0.3667	2.1626	5.8980	0.3104	1.2064
0.30	0.4089	2.1314	5.2130	0.3469	1.1985
-	-	-	-	-	-
0.32	0.4512	2.0991	4.6523	0.3837	1.1904
0.34	0.4933	2.0657	4.1877	0.4206	1.1822
0.36	0.5348	2.0314	3.7984	0.4572	1.1737
0.38	0.5755	1.9964	3.4688	0.4935	1.1652
0.40	0.6151	1.9608	3.1875	0.5290	1.1566
-	-	-	-	-	-
0.42	0.6535	1.9247	2.9454	0.5638	1.1480
0.44	0.6903	1.8882	2.7355	0.5975	1.1394
0.46	0.7254	1.8515	2.5525	0.6301	1.1308
0.48	0.7587	1.8147	2.3918	0.6614	1.1224
0.50	0.7901	1.7778	2.2500	0.6914	1.1141
-	-	-	-	-	-
0.52	0.8196	1.7409	2.1243	0.7199	1.1059
0.54	0.8469	1.7043	2.0122	0.7470	1.0979
0.56	0.8723	1.6678	1.9120	0.7725	1.0901
0.58	0.8955	1.6316	1.8219	0.7965	1.0826
0.60	0.9167	1.5957	1.7407	0.8189	1.0753
-	-	-	-	-	-
0.62	0.9358	1.5603	1.6673	0.8398	1.0682
0.64	0.9530	1.5253	1.6006	0.8592	1.0615
0.66	0.9682	1.4908	1.5399	0.8771	1.0550
0.68	0.9814	1.4569	1.4844	0.8935	1.0489
0.70	0.9929	1.4235	1.4337	0.9085	1.0431
-	-	-	-	-	-
0.72	1.0026	1.3907	1.3871	0.9221	1.0376
0.74	1.0106	1.3585	1.3442	0.9344	1.0325
0.76	1.0171	1.3270	1.3047	0.9455	1.0278
0.78	1.0220	1.2961	1.2682	0.9553	1.0234
0.80	1.0255	1.2658	1.2344	0.9639	1.0193

  

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
0.82	1.0276	1.2362	1.2030	0.9715	1.0157
0.84	1.0285	1.2073	1.1738	0.9781	1.0124
0.86	1.0283	1.1791	1.1467	0.9836	1.0095
0.88	1.0269	1.1515	1.1214	0.9883	1.0070
0.90	1.0245	1.1246	1.0977	0.9921	1.0049
-	-	-	-	-	-
0.92	1.0212	1.0984	1.0756	0.9951	1.0031
0.94	1.0170	1.0728	1.0549	0.9973	1.0017
0.96	1.0121	1.0479	1.0354	0.9988	1.0008
0.98	1.0064	1.0236	1.0172	0.9997	1.0002
1.00	1.0000	1.0000	1.0000	1.0000	1.0000
-	-	-	-	-	-
1.02	0.9930	0.9770	0.9838	0.9997	1.0002
1.04	0.9855	0.9546	0.9686	0.9989	1.0008
1.06	0.9776	0.9327	0.9542	0.9977	1.0017
1.08	0.9691	0.9115	0.9406	0.9960	1.0031
1.10	0.9603	0.8909	0.9277	0.9939	1.0049
-	-	-	-	-	-
1.12	0.9512	0.8708	0.9155	0.9915	1.0070
1.14	0.9417	0.8512	0.9039	0.9887	1.0095
1.16	0.9320	0.8322	0.8930	0.9856	1.0124
1.18	0.9220	0.8137	0.8826	0.9823	1.0157
1.20	0.9118	0.7958	0.8727	0.9787	1.0194
-	-	-	-	-	-
1.22	0.9015	0.7783	0.8633	0.9749	1.0235
1.24	0.8911	0.7613	0.8543	0.9709	1.0279
1.26	0.8805	0.7447	0.8458	0.9668	1.0328
1.28	0.8699	0.7287	0.8376	0.9624	1.0380
1.30	0.8592	0.7130	0.8299	0.9580	1.0437
-	-	-	-	-	-
1.32	0.8484	0.6978	0.8225	0.9534	1.0497
1.34	0.8377	0.6830	0.8154	0.9487	1.0561
1.36	0.8269	0.6686	0.8086	0.9440	1.0629
1.38	0.8161	0.6546	0.8021	0.9391	1.0701
1.40	0.8054	0.6410	0.7959	0.9343	1.0777
-	-	-	-	-	-
1.42	0.7947	0.6278	0.7900	0.9293	1.0856
1.44	0.7840	0.6149	0.7843	0.9243	1.0940
1.46	0.7735	0.6024	0.7788	0.9193	1.1028
1.48	0.7629	0.5902	0.7736	0.9143	1.1120
1.50	0.7525	0.5783	0.7685	0.9093	1.1215
-	-	-	-	-	-
1.52	0.7422	0.5668	0.7637	0.9042	1.1315
1.54	0.7319	0.5555	0.7590	0.8992	1.1419
1.56	0.7217	0.5446	0.7545	0.8942	1.1527
1.58	0.7117	0.5339	0.7502	0.8892	1.1640
1.60	0.7017	0.5236	0.7461	0.8842	1.1756

  

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
1.62	0.6919	0.5135	0.7421	0.8792	1.1877
1.64	0.6822	0.5036	0.7383	0.8743	1.2002
1.66	0.6726	0.4940	0.7345	0.8694	1.2131
1.68	0.6631	0.4847	0.7310	0.8645	1.2264
1.70	0.6538	0.4756	0.7275	0.8597	1.2402
-	-	-	-	-	-
1.72	0.6445	0.4668	0.7242	0.8549	1.2545
1.74	0.6355	0.4581	0.7210	0.8502	1.2692
1.76	0.6265	0.4497	0.7178	0.8455	1.2843
1.78	0.6176	0.4415	0.7148	0.8409	1.2999
1.80	0.6089	0.4335	0.7119	0.8363	1.3159
-	-	-	-	-	-
1.82	0.6004	0.4257	0.7091	0.8317	1.3324
1.84	0.5919	0.4181	0.7064	0.8273	1.3494
1.86	0.5836	0.4107	0.7038	0.8228	1.3669
1.88	0.5754	0.4035	0.7012	0.8185	1.3849
1.90	0.5673	0.3964	0.6988	0.8141	1.4033
-	-	-	-	-	-
1.92	0.5594	0.3895	0.6964	0.8099	1.4222
1.94	0.5516	0.3828	0.6940	0.8057	1.4417
1.96	0.5439	0.3763	0.6918	0.8015	1.4616
1.98	0.5364	0.3699	0.6896	0.7974	1.4821
2.00	0.5289	0.3636	0.6875	0.7934	1.5031
-	-	-	-	-	-
2.02	0.5216	0.3575	0.6854	0.7894	1.5246
2.04	0.5144	0.3516	0.6835	0.7855	1.5467
2.06	0.5074	0.3458	0.6815	0.7816	1.5693
2.08	0.5004	0.3401	0.6796	0.7778	1.5924
2.10	0.4936	0.3345	0.6778	0.7741	1.6162
-	-	-	-	-	-
2.12	0.4868	0.3291	0.6760	0.7704	1.6404
2.14	0.4802	0.3238	0.6743	0.7667	1.6653
2.16	0.4737	0.3186	0.6726	0.7631	1.6908
2.18	0.4673	0.3136	0.6710	0.7596	1.7168
2.20	0.4611	0.3086	0.6694	0.7561	1.7434
-	-	-	-	-	-
2.22	0.4549	0.3038	0.6679	0.7527	1.7707
2.24	0.4488	0.2991	0.6664	0.7493	1.7986
2.26	0.4428	0.2945	0.6649	0.7460	1.8271
2.28	0.4370	0.2899	0.6635	0.7428	1.8562
2.30	0.4312	0.2855	0.6621	0.7395	1.8860
-	-	-	-	-	-
2.32	0.4256	0.2812	0.6607	0.7364	1.9165
2.34	0.4200	0.2769	0.6594	0.7333	1.9476
2.36	0.4145	0.2728	0.6581	0.7302	1.9794
2.38	0.4091	0.2688	0.6569	0.7272	2.0119
2.40	0.4038	0.2648	0.6557	0.7242	2.0451

Table E.2: Rayleigh flow properties for  $\gamma = 1.4$

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
2.42	0.3986	0.2609	0.6545	0.7213	2.0789
2.44	0.3935	0.2571	0.6533	0.7184	2.1136
2.46	0.3885	0.2534	0.6522	0.7156	2.1489
2.48	0.3836	0.2497	0.6511	0.7128	2.1850
2.50	0.3787	0.2462	0.6500	0.7101	2.2218
-	-	-	-	-	-
2.52	0.3739	0.2427	0.6489	0.7074	2.2594
2.54	0.3692	0.2392	0.6479	0.7047	2.2978
2.56	0.3646	0.2359	0.6469	0.7021	2.3370
2.58	0.3601	0.2326	0.6459	0.6995	2.3770
2.60	0.3556	0.2294	0.6450	0.6970	2.4177
-	-	-	-	-	-
2.62	0.3512	0.2262	0.6440	0.6945	2.4593
2.64	0.3469	0.2231	0.6431	0.6921	2.5018
2.66	0.3427	0.2201	0.6422	0.6896	2.5451
2.68	0.3385	0.2171	0.6413	0.6873	2.5892
2.70	0.3344	0.2142	0.6405	0.6849	2.6343
-	-	-	-	-	-
2.72	0.3304	0.2113	0.6397	0.6826	2.6802
2.74	0.3264	0.2085	0.6388	0.6804	2.7270
2.76	0.3225	0.2058	0.6380	0.6781	2.7748
2.78	0.3186	0.2030	0.6372	0.6760	2.8235
2.80	0.3149	0.2004	0.6365	0.6738	2.8731
-	-	-	-	-	-
2.82	0.3111	0.1978	0.6357	0.6717	2.9237
2.84	0.3075	0.1953	0.6350	0.6696	2.9752
2.86	0.3039	0.1927	0.6343	0.6675	3.0278
2.88	0.3004	0.1903	0.6336	0.6655	3.0813
2.90	0.2969	0.1879	0.6329	0.6635	3.1359
-	-	-	-	-	-
2.92	0.2934	0.1855	0.6322	0.6615	3.1914
2.94	0.2901	0.1832	0.6315	0.6596	3.2481
2.96	0.2868	0.1809	0.6309	0.6577	3.3058
2.98	0.2835	0.1787	0.6303	0.6558	3.3646
3.00	0.2803	0.1765	0.6296	0.6540	3.4245
-	-	-	-	-	-
3.02	0.2771	0.1743	0.6290	0.6522	3.4854
3.04	0.2740	0.1722	0.6284	0.6504	3.5476
3.06	0.2709	0.1701	0.6278	0.6486	3.6108
3.08	0.2679	0.1681	0.6273	0.6469	3.6752
3.10	0.2650	0.1660	0.6267	0.6452	3.7408
-	-	-	-	-	-
3.12	0.2620	0.1641	0.6261	0.6435	3.8076
3.14	0.2592	0.1621	0.6256	0.6418	3.8756
3.16	0.2563	0.1602	0.6251	0.6402	3.9449
3.18	0.2535	0.1583	0.6245	0.6386	4.0154
3.20	0.2508	0.1565	0.6240	0.6370	4.0871

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
3.22	0.2481	0.1547	0.6235	0.6354	4.1602
3.24	0.2454	0.1529	0.6230	0.6339	4.2345
3.26	0.2428	0.1511	0.6225	0.6324	4.3101
3.28	0.2402	0.1494	0.6221	0.6309	4.3871
3.30	0.2377	0.1477	0.6216	0.6294	4.4655
-	-	-	-	-	-
3.32	0.2352	0.1461	0.6211	0.6280	4.5452
3.34	0.2327	0.1444	0.6207	0.6265	4.6263
3.36	0.2303	0.1428	0.6202	0.6251	4.7089
3.38	0.2279	0.1412	0.6198	0.6237	4.7929
3.40	0.2255	0.1397	0.6194	0.6224	4.8783
-	-	-	-	-	-
3.42	0.2232	0.1381	0.6190	0.6210	4.9652
3.44	0.2209	0.1366	0.6185	0.6197	5.0536
3.46	0.2186	0.1351	0.6181	0.6184	5.1435
3.48	0.2164	0.1337	0.6177	0.6171	5.2350
3.50	0.2142	0.1322	0.6173	0.6158	5.3280
-	-	-	-	-	-
3.52	0.2120	0.1308	0.6170	0.6145	5.4226
3.54	0.2099	0.1294	0.6166	0.6133	5.5188
3.56	0.2078	0.1280	0.6162	0.6121	5.6167
3.58	0.2057	0.1267	0.6158	0.6109	5.7162
3.60	0.2037	0.1254	0.6155	0.6097	5.8173
-	-	-	-	-	-
3.62	0.2017	0.1241	0.6151	0.6085	5.9201
3.64	0.1997	0.1228	0.6148	0.6074	6.0247
3.66	0.1977	0.1215	0.6144	0.6062	6.1310
3.68	0.1958	0.1202	0.6141	0.6051	6.2390
3.70	0.1939	0.1190	0.6138	0.6040	6.3488
-	-	-	-	-	-
3.72	0.1920	0.1178	0.6134	0.6029	6.4605
3.74	0.1902	0.1166	0.6131	0.6018	6.5739
3.76	0.1884	0.1154	0.6128	0.6008	6.6893
3.78	0.1866	0.1143	0.6125	0.5997	6.8065
3.80	0.1848	0.1131	0.6122	0.5987	6.9256
-	-	-	-	-	-
3.82	0.1830	0.1120	0.6119	0.5977	7.0466
3.84	0.1813	0.1109	0.6116	0.5967	7.1696
3.86	0.1796	0.1098	0.6113	0.5957	7.2945
3.88	0.1779	0.1087	0.6110	0.5947	7.4215
3.90	0.1763	0.1077	0.6107	0.5937	7.5505
-	-	-	-	-	-
3.92	0.1746	0.1066	0.6104	0.5928	7.6816
3.94	0.1730	0.1056	0.6102	0.5918	7.8147
3.96	0.1714	0.1046	0.6099	0.5909	7.9499
3.98	0.1699	0.1036	0.6096	0.5900	8.0873
4.00	0.1683	0.1026	0.6094	0.5891	8.2268

$M$	$T/T^*$	$P/P^*$	$\rho/\rho^*$	$T_0/T_0^*$	$P_0/P_0^*$
4.02	0.1668	0.1016	0.6091	0.5882	8.3686
4.04	0.1653	0.1006	0.6089	0.5873	8.5125
4.06	0.1638	0.0997	0.6086	0.5864	8.6587
4.08	0.1623	0.0987	0.6084	0.5856	8.8072
4.10	0.1609	0.0978	0.6081	0.5847	8.9579
-	-	-	-	-	-
4.12	0.1594	0.0969	0.6079	0.5839	9.1110
4.14	0.1580	0.0960	0.6076	0.5831	9.2665
4.16	0.1566	0.0951	0.6074	0.5823	9.4243
4.18	0.1552	0.0943	0.6072	0.5814	9.5846
4.20	0.1539	0.0934	0.6070	0.5807	9.7473
-	-	-	-	-	-
4.22	0.1525	0.0926	0.6067	0.5799	9.9125
4.24	0.1512	0.0917	0.6065	0.5791	10.0802
4.26	0.1499	0.0909	0.6063	0.5783	10.2504
4.28	0.1486	0.0901	0.6061	0.5776	10.4232
4.30	0.1473	0.0893	0.6059	0.5768	10.5985
-	-	-	-	-	-
4.32	0.1461	0.0885	0.6057	0.5761	10.7766
4.34	0.1448	0.0877	0.6055	0.5754	10.9572
4.36	0.1436	0.0869	0.6053	0.5746	11.1406
4.38	0.1424	0.0862	0.6051	0.5739	11.3267
4.40	0.1412	0.0854	0.6049	0.5732	11.5155
-	-	-	-	-	-
4.42	0.1400	0.0847	0.6047	0.5725	11.7072
4.44	0.1388	0.0839	0.6045	0.5718	11.9016
4.46	0.1377	0.0832	0.6043	0.5712	12.0989
4.48	0.1365	0.0825	0.6041	0.5705	12.2991
4.50	0.1354	0.0818	0.6039	0.5698	12.5023
-	-	-	-	-	-
4.52	0.1343	0.0811	0.6037	0.5692	12.7083
4.54	0.1332	0.0804	0.6035	0.5685	12.9174
4.56	0.1321	0.0797	0.6034	0.5679	13.1295
4.58	0.1310	0.0790	0.6032	0.5673	13.3446
4.60	0.1300	0.0784	0.6030	0.5666	13.5629
-	-	-	-	-	-
4.62	0.1289	0.0777	0.6029	0.5660	13.7843
4.64	0.1279	0.0771	0.6027	0.5654	14.0088
4.66	0.1268	0.0764	0.6025	0.5648	14.2365
4.68	0.1258	0.0758	0.6024	0.5642	14.4675
4.70	0.1248	0.0752	0.6022	0.5636	14.7017
-	-	-	-	-	-
4.72	0.1238	0.0746	0.6020	0.5630	14.9393
4.74	0.1229	0.0739	0.6019	0.5625	15.1802
4.76	0.1219	0.0733	0.6017	0.5619	15.4245
4.78	0.1209	0.0728	0.6016	0.5613	15.6722
4.80	0.1200	0.0722	0.6014	0.5608	15.9234