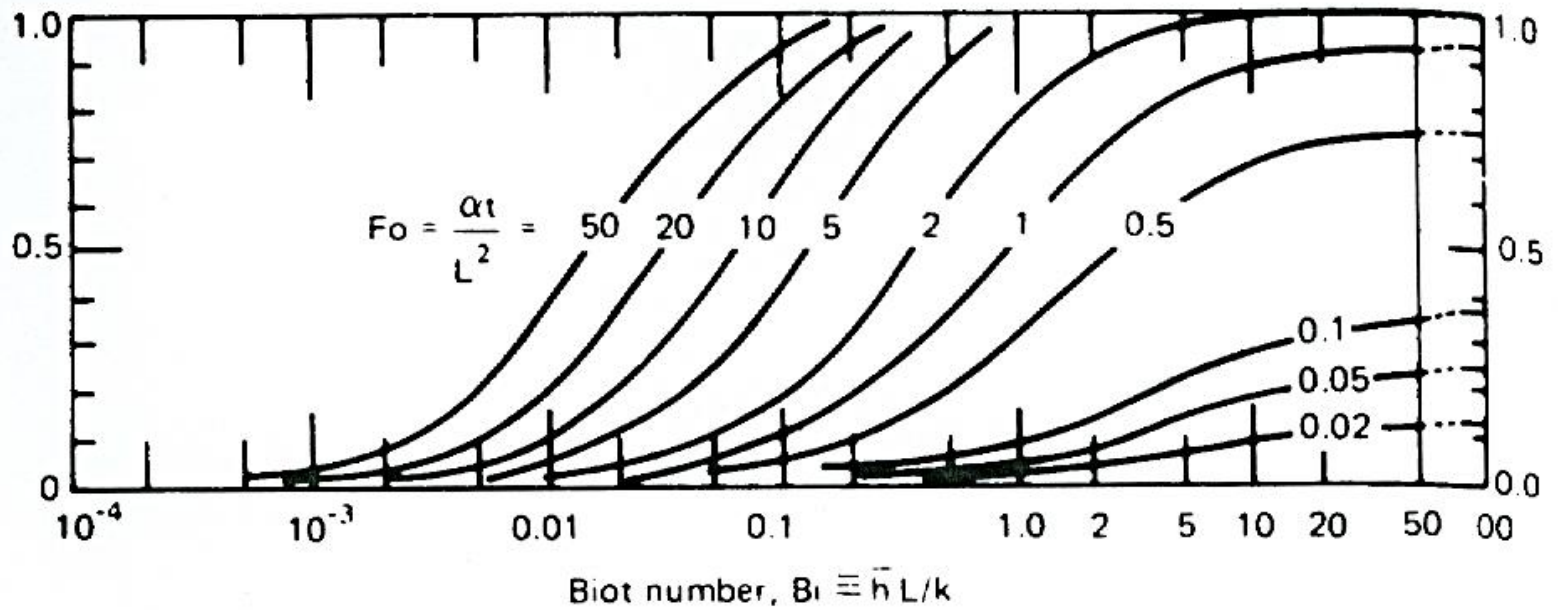


Figure 5.7 The transient temperature distribution in a *slab* at six positions: $x/L = 0$ is the center, $x/L = 1$ is one outside boundary.

$$\Phi \equiv \frac{\int_0^t q dt}{\rho c L (T_i - T_\infty)}$$



a.) Slab of thickness, L , insulated on one side

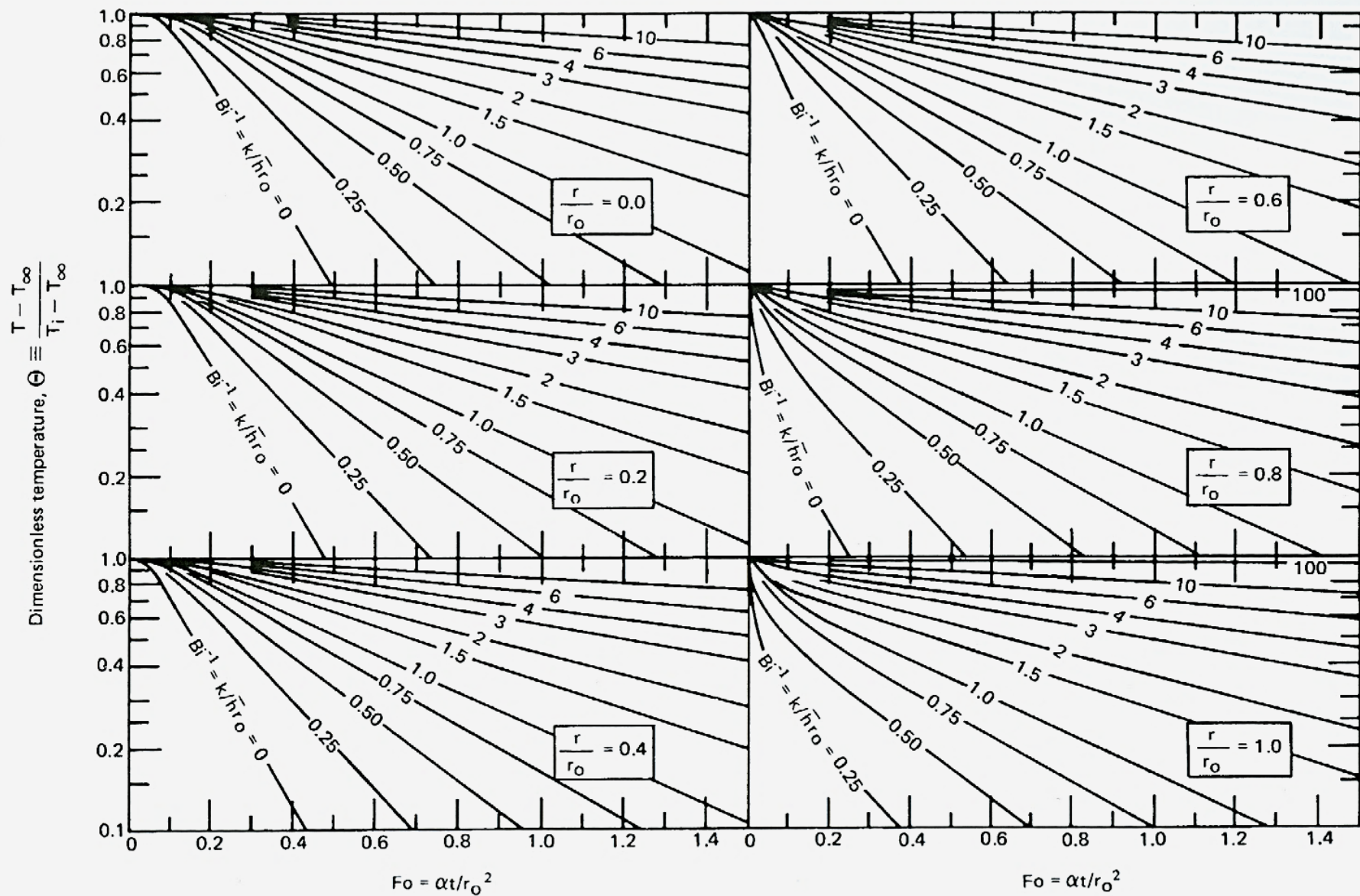
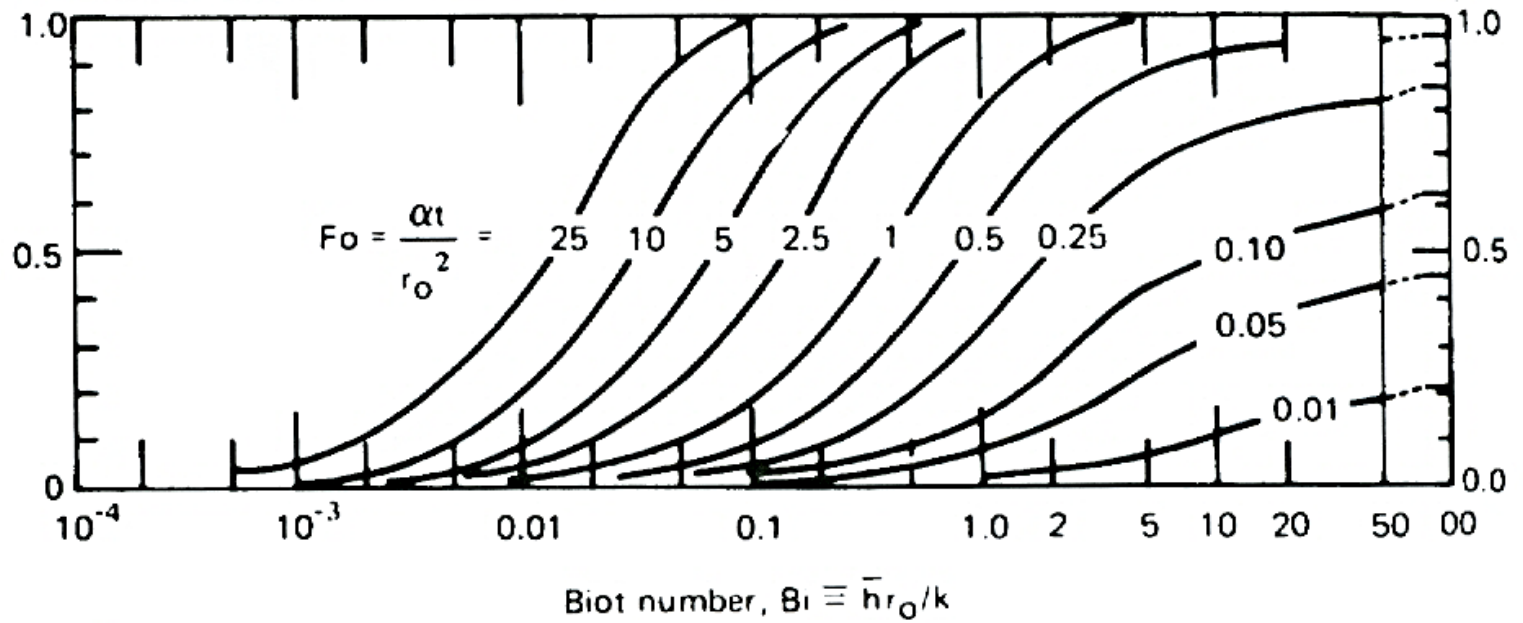


Figure 5.8 The transient temperature distribution in a long *cylinder* of radius r_o at six positions: $r/r_o = 0$ is the centerline; $r/r_o = 1$ is the outside boundary.

$$\Phi \equiv \frac{\left(\int_0^t Q dt \right) / \text{unit length}}{\rho c \pi r_0^2 (T_i - T_\infty)}$$



b.) Cylinder, of radius, r_0

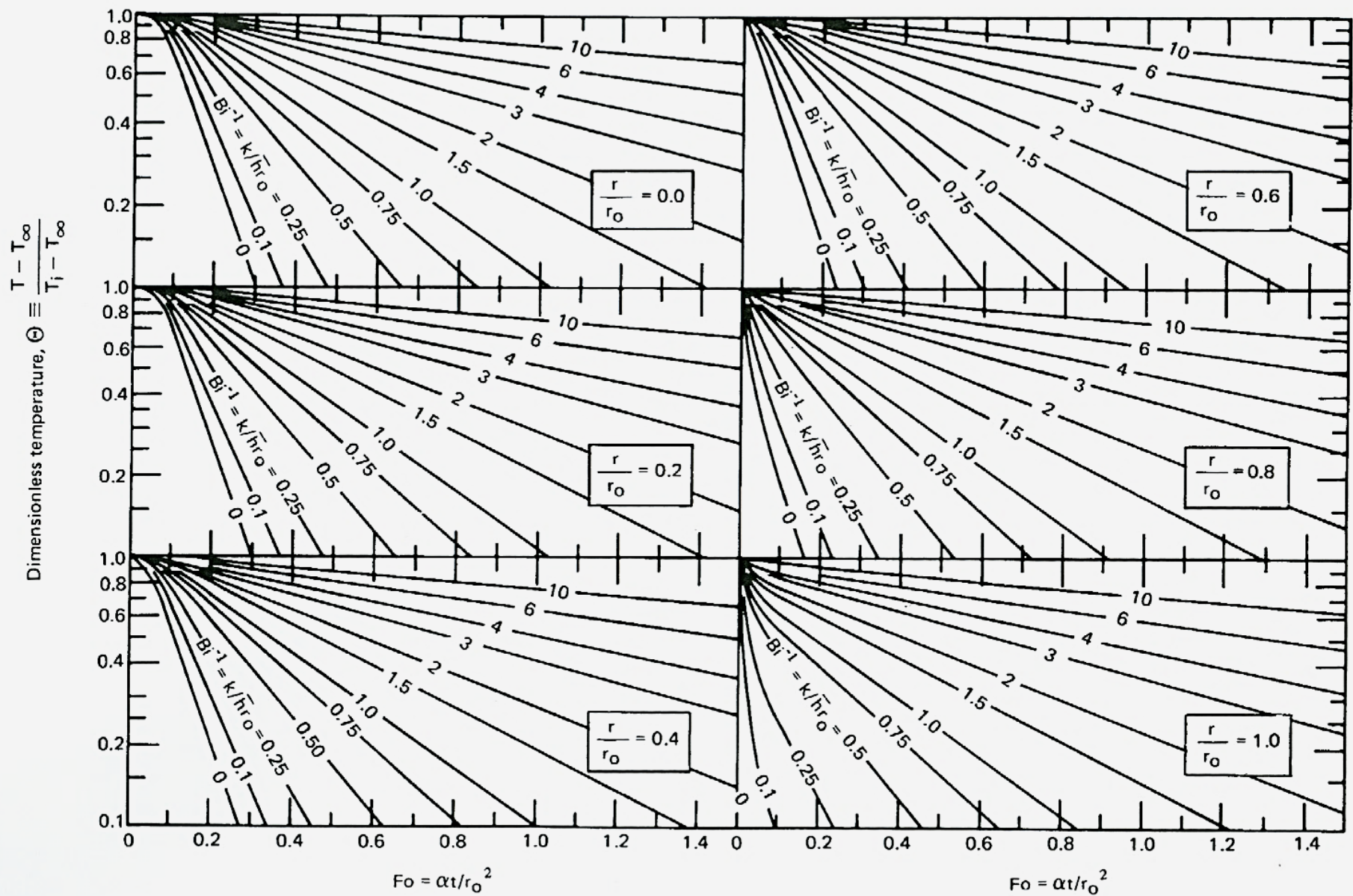
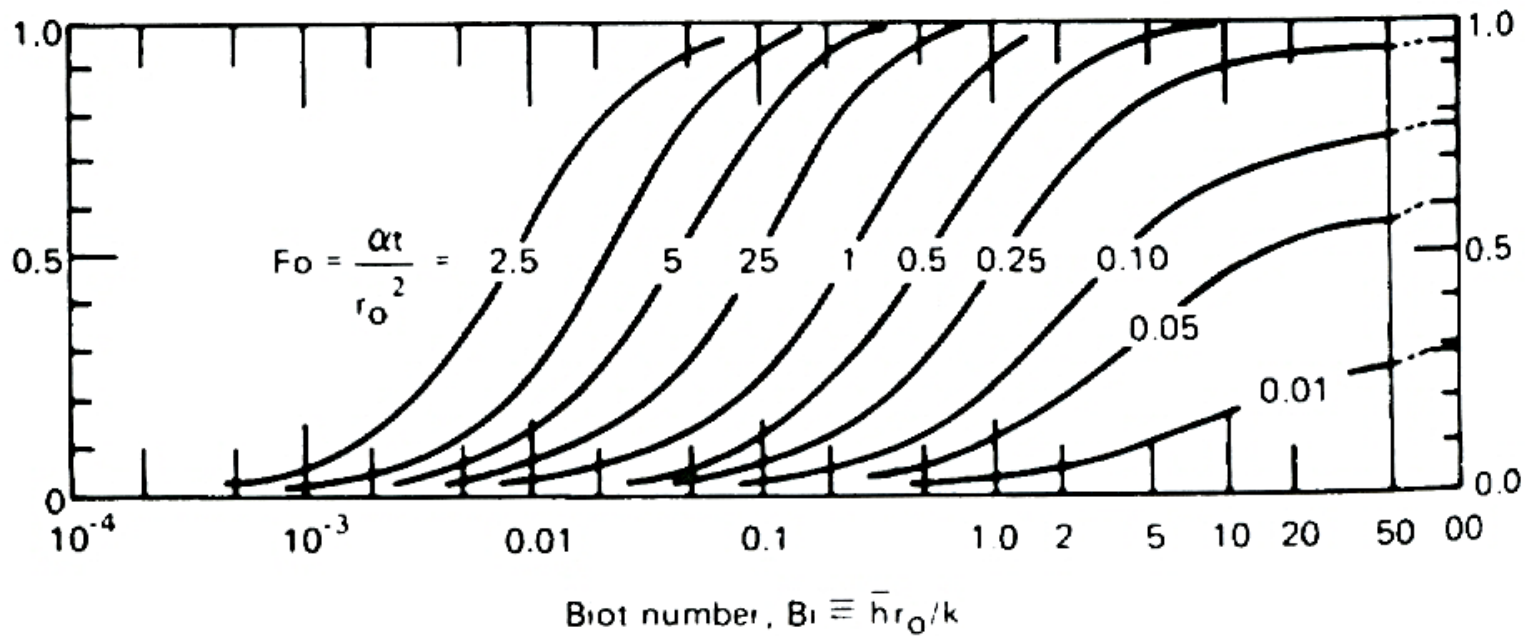


Figure 5.9 The transient temperature distribution in a *sphere* of radius r_o at six positions: $r/r_o = 0$ is the center; $r/r_o = 1$ is the outside boundary.

$$\phi \equiv \frac{\int_0^t \text{Odt}}{\frac{4}{3} \pi r_0^3 (T_i - T_\infty)}$$



c.) Sphere, of radius, r_0

Error Function Tabulated

ϕ	$\text{erf}(\phi)$	ϕ	$\text{erf}(\phi)$	ϕ	$\text{erf}(\phi)$
0.000	0.0000	0.850	0.7707	1.700	0.9838
0.025	0.0282	0.875	0.7841	1.725	0.9853
0.050	0.0564	0.900	0.7969	1.750	0.9867
0.075	0.0845	0.925	0.8092	1.775	0.9879
0.100	0.1125	0.950	0.8209	1.800	0.9891
0.125	0.1403	0.975	0.8321	1.825	0.9901
0.150	0.1680	1.000	0.8427	1.850	0.9911
0.175	0.1955	1.025	0.8528	1.875	0.9920
0.200	0.2227	1.050	0.8624	1.900	0.9928
0.225	0.2497	1.075	0.8716	1.925	0.9935
0.250	0.2763	1.100	0.8802	1.950	0.9942
0.275	0.3027	1.125	0.8884	1.975	0.9948
0.300	0.3286	1.150	0.8961	2.000	0.9953
0.325	0.3542	1.175	0.9034	2.025	0.9958
0.350	0.3794	1.200	0.9103	2.050	0.9963
0.375	0.4041	1.225	0.9168	2.075	0.9967
0.400	0.4284	1.250	0.9229	2.100	0.9970
0.425	0.4522	1.275	0.9286	2.125	0.9973
0.450	0.4755	1.300	0.9340	2.150	0.9976
0.475	0.4983	1.325	0.9390	2.175	0.9979
0.500	0.5205	1.350	0.9438	2.200	0.9981
0.525	0.5422	1.375	0.9482	2.225	0.9983
0.550	0.5633	1.400	0.9523	2.250	0.9985
0.575	0.5839	1.425	0.9561	2.275	0.9987
0.600	0.6039	1.450	0.9597	2.300	0.9989
0.625	0.6232	1.475	0.9630	2.325	0.9990
0.650	0.6420	1.500	0.9661	2.350	0.9991
0.675	0.6602	1.525	0.9690	2.375	0.9992
0.700	0.6778	1.550	0.9716	2.400	0.9993
0.725	0.6948	1.575	0.9741	2.425	0.9994
0.750	0.7112	1.600	0.9763	2.450	0.9995
0.775	0.7269	1.625	0.9784	2.475	0.9995
0.800	0.7421	1.650	0.9804		
0.825	0.7567	1.675	0.9822		