

Regions	$(a,b)=(\frac{1}{10},1)$ $(c,d)=(\frac{1}{10},1)$	$(a,b)=(1,2)$ $(c,d)=(3,4)$	$(a,b)=(4,7)$ $(c,d)=(2,4)$	$(a,b)=(4,7)$ $(c,d)=(2,4)$	$(a,b)=(\frac{1}{2},10)$ $(c,d)=(\frac{1}{2},10)$	$(a,b)=(\frac{1}{2},10)$ $(c,d)=(10,20)$
(MAXTERMS, MAXDEGREE)	(15,15)	(15,15)	(10,10)	(15,15)	(15,15)	(15,15)
Number of Subregions	25	2	31	8	134	29
Approximation Generation Time (s)	518.216	12.836	187.195	63.439	1517.578	252.943
$\ f\ _\infty$	19.71	0.33	0.05	0.05	3.14	0.57
Max Error ($\ f - approx\ _\infty / \max(\ f\ _\infty, 1)$)	4.54e-15	1.40e-15	2.54e-16	2.66e-15	3.98e-15	4.93e-15
Original Maple Time (s)	4.988	4.993	5.033	5.565	6.057	4.741
evalf Time (s)	8.561	10.576	7.376	10.232	17.049	10.520
evalhf Time (s)	1.032	1.472	0.940	1.397	1.612	1.348
Compiled Time (s)	0.108	0.132	0.104	0.136	0.148	0.128
Speedup Factor (origMaple/evalf)	-	-	-	-	-	-
Speedup Factor (evalf/evalhf)	8.296	7.188	7.847	7.323	10.58	7.804
Speedup Factor (evalhf/compiled)	9.556	11.15	9.038	10.27	10.89	10.53
Overall Speedup (origMaple/compiled)	46.19	37.83	48.39	40.92	40.93	37.04
Original Maple Plot Time (s)	0.128	0.148	0.664	0.692	0.200	0.704
Approximation Plot Time (s)	0.024	0.028	0.024	0.024	0.032	0.024
Plot Speedup Factor	5.333	5.286	27.67	28.83	6.250	29.33

Table 7.5: Timings and Errors for Approximating $\beta(x, y)$ Using Rational Approximation

Regions	$(a,b)=(\frac{1}{100},1)$ $(c,d)=(\frac{1}{100},1)$	$(a,b)=(\frac{1}{10},1)$ $(c,d)=(\frac{1}{10},1)$	$(a,b)=(1,2)$ $(c,d)=(3,4)$	$(a,b)=(4,7)$ $(c,d)=(2,4)$	$(a,b)=(\frac{1}{2},10)$ $(c,d)=(\frac{1}{2},10)$	$(a,b)=(\frac{1}{2},10)$ $(c,d)=(10,25)$
(MAXTERMS, MAXDEGREE)	(15,30)	(15,25)	(15,25)	(15,30)	(15,30)	(15,30)
Number of Subregions	73	16	1	1	31	18
Approximation Generation Time (s)	270.752	73.980	3.908	5.932	221.941	112.559
$\ f\ _\infty$	199.97	19.71	0.33	0.05	3.14	0.57
Max Error ($\ f - approx\ _\infty / \max(\ f\ _\infty, 1)$)	4.00e-16	1.61e-15	2.60e-16	5.06e-17	9.87e-16	2.63e-15
Original Maple Time (s)	5.281	5.324	5.140	4.920	4.961	5.112
evalf Time (s)	13.717	10.533	11.881	15.517	17.985	13.909
evalhf Time (s)	1.256	1.144	1.356	1.760	1.728	1.356
Compiled Time (s)	0.124	0.116	0.136	0.148	0.156	0.132
Speedup Factor (origMaple/evalf)	-	-	-	-	-	-
Speedup Factor (evalf/evalhf)	10.92	9.205	8.761	8.818	10.41	10.26
Speedup Factor (evalhf/compiled)	10.13	9.862	9.971	11.89	11.08	10.27
Overall Speedup (origMaple/compiled)	42.59	45.90	37.79	33.24	31.80	38.73
Original Maple Plot Time (s)	0.148	0.132	0.148	0.448	0.192	0.432
Approximation Plot Time (s)	0.024	0.024	0.024	0.028	0.032	0.028
Plot Speedup Factor	6.167	5.500	6.167	16.00	6.000	15.43

Table 7.6: Timings and Errors for Approximating $\beta(x, y)$ Using Polynomial Approximation