

Systematic Calculation of Loop Points for Parametric Curves

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Numerical results that are not included in the paper.

The following results are obtained using the worksheet for Example 1.

Loop point number 1	NLPSolve	LSSolve	fsolve
t values =	3.082	3.082	3.082
t values =	-3.749	-3.749	-3.749
x values =	-7.704	-7.704	-7.704
y values =	39.667	39.667	39.667

The following results are obtained using the worksheet for Example 2.

Loop point number 1	NLPSolve	LSSolve	fsolve
t values =	1.473	1.473	1.473
t values =	-0.064	-0.064	-0.064
x values =	2.068	2.068	2.068
y values =	3.193	3.193	3.193

The following results are obtained using the worksheet for Example 3.

Loop point number 1	NLPSolve	LSSolve	fsolve
t values =	1.915	1.915	1.915
t values =	0.130	0.130	0.130
x values =	0.645	0.645	0.645
y values =	0.926	0.926	0.926

Loop point number 2	NLPSolve	LSSolve	fsolve
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t values =	2.986	2.986	2.986
t values =	1.283	1.283	1.283
x values =	2.373	2.373	2.373
y values =	2.274	2.274	2.274

Loop point number 3

	NLPSolve	LSSolve	fsolve
t values =	4.599	4.599	4.599
t values =	3.561	3.561	3.561
x values =	5.048	5.048	5.048
y values =	4.063	4.063	4.063

Loop point number 4

	NLPSolve	LSSolve	fsolve
t values =	5.864	5.864	5.864
t values =	4.826	4.826	4.826
x values =	4.377	4.377	4.377
y values =	5.362	5.362	5.362

Loop point number 5

	NLPSolve	LSSolve	fsolve
t values =	1.859	1.859	1.859
t values =	0.156	0.156	0.156
x values =	0.769	0.769	0.769
y values =	0.867	0.867	0.867

Loop point number 6

	NLPSolve	LSSolve	fsolve
t values =	3.011	3.011	3.011
t values =	1.227	1.227	1.227
x values =	2.497	2.497	2.497
y values =	2.216	2.216	2.216

The following results are obtained using the worksheet for Example 4.

Loop point number 1

	NLPSolve	LSSolve	fsolve
t values =	4.084	4.084	4.084
t values =	0.942	0.942	0.942
x values =	0.683	0.683	0.683
y values =	0.941	0.941	0.941

Loop point number 2

	NLPSolve	LSSolve	fsolve
t values =	7.540	7.540	7.540
t values =	1.257	1.257	1.257

x values = 0.294 0.294 0.294
y values = 0.905 0.905 0.905

Loop point number 3

	NLPSolve	LSSolve	fsolve
t values =	7.854	7.854	7.854
t values =	4.712	4.712	4.712
x values =	0.000	0.000	0.000
y values =	1.354	1.354	1.354

Loop point number 4

	NLPSolve	LSSolve	fsolve
t values =	9.739	9.739	9.739
t values =	0.314	0.314	0.314
x values =	0.630	0.630	0.630
y values =	0.205	0.205	0.205

Loop point number 5

	NLPSolve	LSSolve	fsolve
t values =	10.053	10.053	10.053
t values =	3.770	3.770	3.770
x values =	0.476	0.475	0.476
y values =	0.345	0.345	0.345

Loop point number 6

	NLPSolve	LSSolve	fsolve
t values =	11.624	11.624	11.624
t values =	8.482	8.482	8.482
x values =	-0.683	-0.683	-0.683
y values =	0.941	0.941	0.941

Loop point number 7

	NLPSolve	LSSolve	fsolve
t values =	11.310	11.310	11.310
t values =	5.027	5.027	5.027
x values =	-0.294	-0.294	-0.294
y values =	0.904	0.904	0.904

Loop point number 8

	NLPSolve	LSSolve	fsolve
t values =	8.796	8.797	8.796
t values =	2.513	2.513	2.513
x values =	-0.476	-0.475	-0.476
y values =	0.345	0.345	0.345

Loop point number 9

	NLPSolve	LSSolve	fsolve
t values =	12.252	12.252	12.252
t values =	2.827	2.827	2.827
x values =	-0.630	-0.630	-0.630
y values =	0.205	0.205	0.205

Loop point number 10

	NLPSolve	LSSolve	fsolve
t values =	10.367	10.367	10.367
t values =	7.226	7.226	7.226
x values =	0.268	0.268	0.268
y values =	0.368	0.368	0.368

Loop point number 11

	NLPSolve	LSSolve	fsolve
t values =	5.341	5.341	5.341
t values =	2.199	2.199	2.199
x values =	-0.268	-0.268	-0.268
y values =	0.368	0.368	0.368

Loop point number 12

	NLPSolve	LSSolve	fsolve
t values =	9.098	9.098	9.098
t values =	3.468	3.468	3.468
x values =	-0.000	-0.000	-0.000
y values =	-0.000	-0.000	-0.000

The following results are obtained using the worksheet for Example 5.

Loop point number 1

	NLPSolve	LSSolve	fsolve
t values =	10.530	10.530	10.530
t values =	-17.745	-17.745	-17.745
x values =	1.310	1.310	1.310
y values =	2.605	2.605	2.605

Loop point number 2

	NLPSolve	LSSolve	fsolve
t values =	8.320	8.320	8.320
t values =	-1.105	-1.105	-1.105
x values =	1.310	1.310	1.310
y values =	-2.605	-2.605	-2.605

Loop point number 3

	NLPSolve	LSSolve	fsolve
t values =	4.133	4.133	4.133

t values =	0.991	0.991	0.991
x values =	0.645	0.645	0.645
y values =	0.985	0.985	0.985

Loop point number 4

	NLPSolve	LSSolve	fsolve
t values =	17.859	17.859	17.859
t values =	14.717	14.717	14.717
x values =	0.645	0.645	0.645
y values =	-0.985	-0.985	-0.985

Loop point number 5

	NLPSolve	LSSolve	fsolve
t values =	18.850	18.850	18.850
t values =	0.000	0.000	0.000
x values =	2.000	2.000	2.000
y values =	0.000	0.000	0.000

Loop point number 6

	NLPSolve	LSSolve	fsolve
t values =	15.708	15.708	15.708
t values =	3.142	3.142	3.142
x values =	0.500	0.500	0.500
y values =	0.000	-0.000	-0.000

Loop point number 7

	NLPSolve	LSSolve	fsolve
t values =	-6.283	-6.283	-6.283
t values =	-12.566	-12.566	-12.566
x values =	6.330	6.330	6.330
y values =	0.000	0.000	0.000

Loop point number 8

	NLPSolve	LSSolve	fsolve
t values =	16.380	16.380	16.380
t values =	2.469	2.469	2.469
x values =	-0.000	0.000	0.000
y values =	0.000	0.000	0.000

Loop point number 9

	NLPSolve	LSSolve	fsolve
t values =	12.566	12.566	12.566
t values =	6.283	6.283	6.283
x values =	-2.330	-2.330	-2.330
y values =	0.000	-0.000	0.000

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Loop point number 10
      NLPSolve  LSSolve  fsolve
t values =    -3.142   -3.142   -3.142
t values =   -15.708  -15.708  -15.708
x values =    -4.500   -4.500   -4.500
y values =     0.000   -0.000    0.000
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