

Performance comparison: sinusoid approximation

Command Window

```
>> P = FunctionApproximation.Problem('sin');
P.Options.BreakpointSpecification = 'ExplicitValues';
P.Options.Interpolation="Flat";
P.Options.UseBPSpecAsIs = true;
P.Options.AbsTol = 2^-7; %default
P.Options.RelTol = 2^-7; %default
P.Options.WordLengths = 16; %default
```

function	time (<=21b) (seconds)	time(>=22a) (seconds)	reduction rate	LUT size (<=21b)	LUT size (>=22a)	reduction rate
sin	50.89			512		

```
tic;
solve(P);
toc;
```

ID	Memory (bits)	Feasible	Table Size	Breakpoints Ws	TableData WL	BreakpointSpecification	Error (Max,Current)
0	9376	0	293	16	16	ExplicitValues	7.812500e-03, 1.267820e-02
1	9344	0	292	16	16	ExplicitValues	7.812500e-03, 1.267820e-02
2	16448	1	514	16	16	ExplicitValues	7.812500e-03, 7.751285e-03
3	16416	1	513	16	16	ExplicitValues	7.812500e-03, 7.751285e-03
4	16384	1	512	16	16	ExplicitValues	7.812500e-03, 4.937959e-03

Best Solution

ID	Memory (bits)	Feasible	Table Size	Breakpoints Ws	TableData WL	BreakpointSpecification	Error (Max,Current)
4	16384	1	512	16	16	ExplicitValues	7.812500e-03, 4.937959e-03

Elapsed time is 50.887588 seconds.

fx >>

Performance comparison: sinusoid approximation

```
>> P = FunctionApproximation.Problem('sin');
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P.Options.UseBPSpecAsIs = true;
P.Options.AbsTol = 2^-7; %default
P.Options.RelTol = 2^-7; %default
P.Options.WordLengths = 16; %default
```

function	time (<=21b) (seconds)	time(>=22a) (seconds)	reduction rate	LUT size (<=21b)	LUT size (>=22a)	reduction rate
sin	50.89	2.82	94.5%	512	257	49.8%

```
tic;
solve(P);
toc;
```

ID	Memory (bits)	Feasible	Table Size	Breakpoints WLS	TableData WL	BreakpointSpecification	Error (Max,Current)
0	8224	1	257	16	16	ExplicitValues	7.812500e-03, 7.804682e-03

Best Solution

ID	Memory (bits)	Feasible	Table Size	Breakpoints WLS	TableData WL	BreakpointSpecification	Error (Max,Current)
0	8224	1	257	16	16	ExplicitValues	7.812500e-03, 7.804682e-03

Elapsed time is 2.822972 seconds.

fx >>

Performance comparison: 1/8 default tolerance & 64 WL

function	time (<=21b) (seconds)	time(>=22a) (seconds)	reduction rate	LUT size (<=21b)	LUT size (>=22a)	reduction rate
sin	12101.94	49.45	99.59%	8223	4137	49.7%
1/x	3454.14	36.62	98.94%	1372	1235	10.0%
10^x	6022.40	46.67	99.23%	4494	3315	26.2%
2^x	2248.20	32.09	98.57%	1372	1234	10.1%
acosh	18857.00	86.89	99.54%	3256	2446	24.9%
atan	7191.68	106.35	98.52%	3784	3578	5.4%
atanh	10275.87	99.52	99.03%	4755	4595	3.4%
cos	12852.88	50.50	99.61%	8266	4137	50.0%
cosh	22821.63	100.22	99.56%	13624	7129	47.7%
exp	3170.34	34.30	98.92%	1958	1690	13.7%
log	8101.26	55.25	99.32%	3163	2675	15.4%
log10	4093.41	46.84	98.86%	1457	1489	-2.2%
log2	10662.58	79.72	99.25%	4024	3478	13.6%
sinh	27641.96	120.85	99.56%	13124	9277	29.3%
sqrt	1569.43	26.90	98.29%	701	662	5.6%
tan	22924.45	145.42	99.37%	11075	8582	22.5%
tanh	4586.90	54.00	98.82%	2110	2157	-2.2%
x^2	14423.53	82.40	99.43%	9826	4145	57.8%
TOTAL	192999.60(i.e., 54 hours)	1253.99 (i.e., 20min)	99.35%			21.2%

x153 faster, 21% smaller