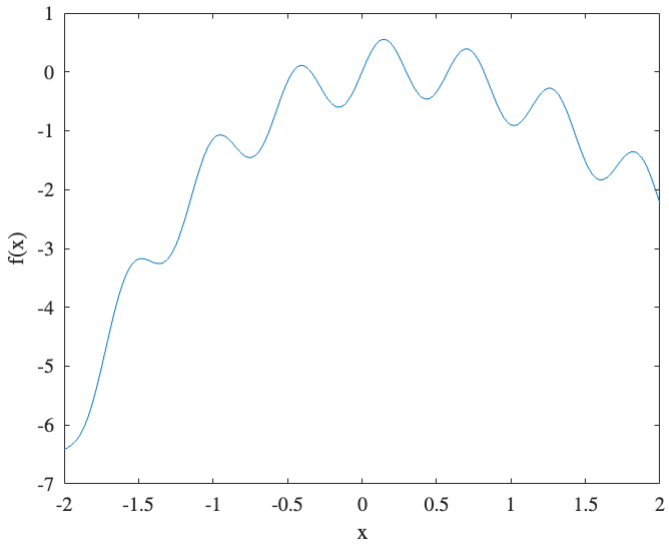
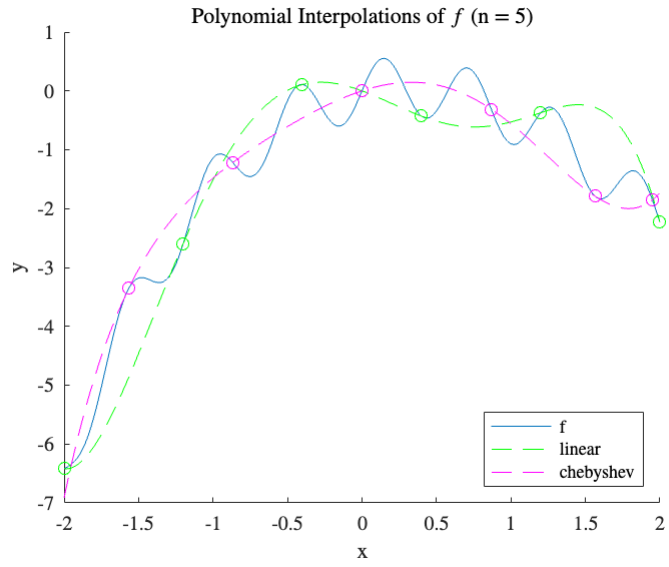
Lab 3

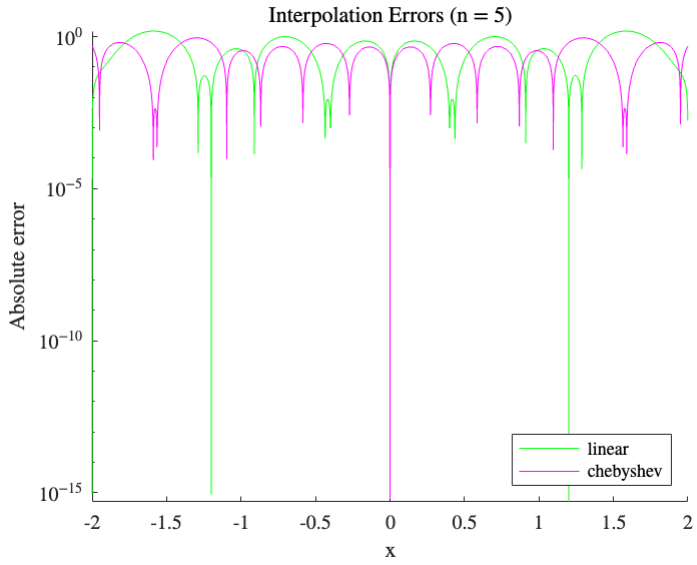
Jessie Li // October 4, 2023

1. Neville's method with Chebyshev points

```
main1
```








```
------------ n = 5 ------------
max linear error: 1.52225
max chebyshev error: 0.90791
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------------ n = 10 -----------
max linear error: 1.04586
max chebyshev error: 9.72581
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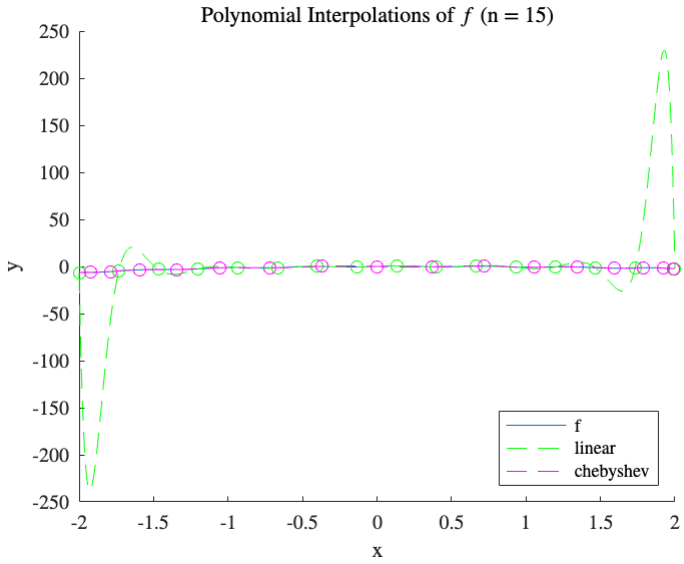
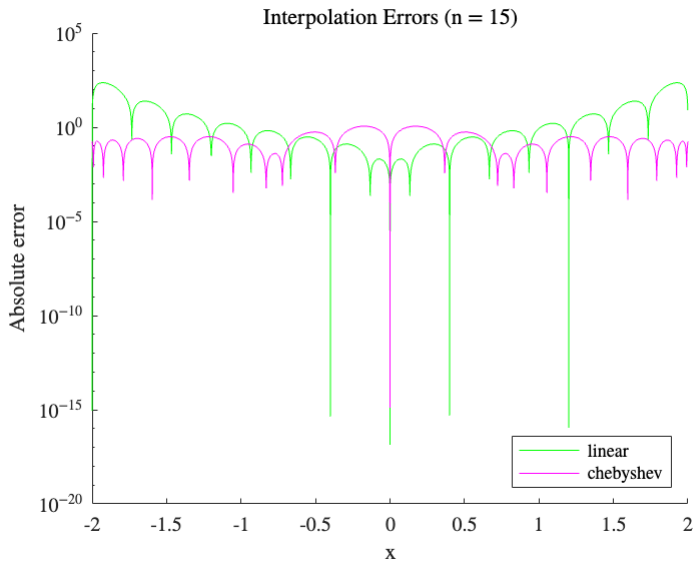
```






```
------------ n = 15 ------------
max linear error: 231.34063
max chebyshev error: 1.13225
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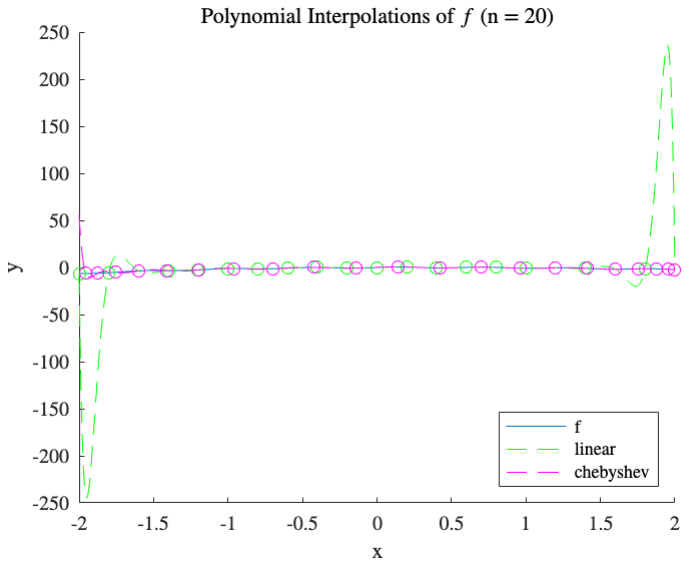
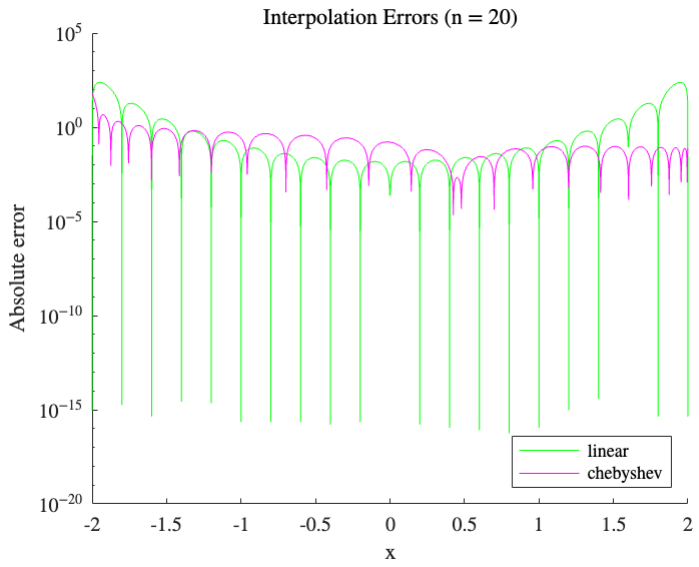
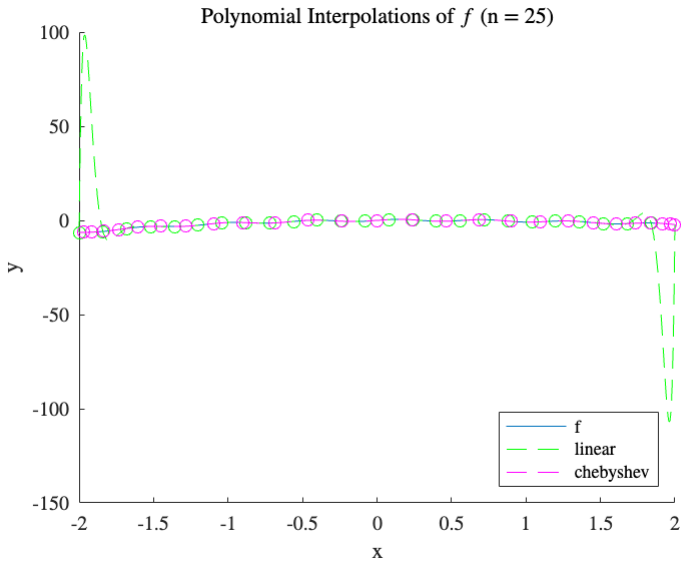
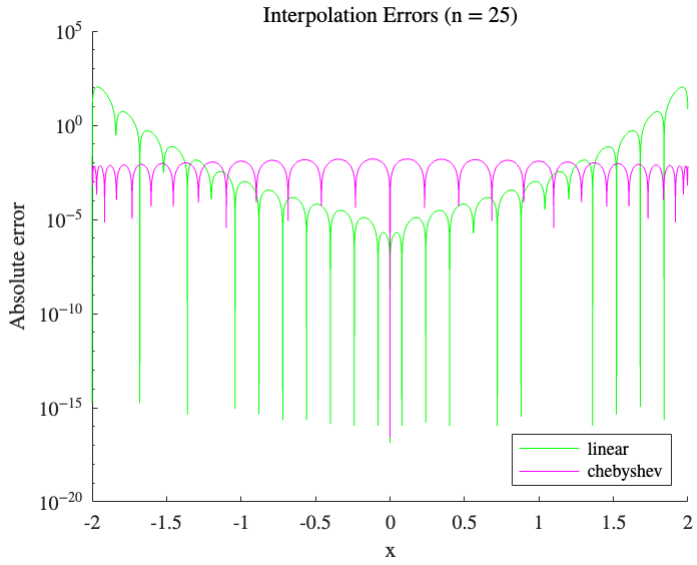
```



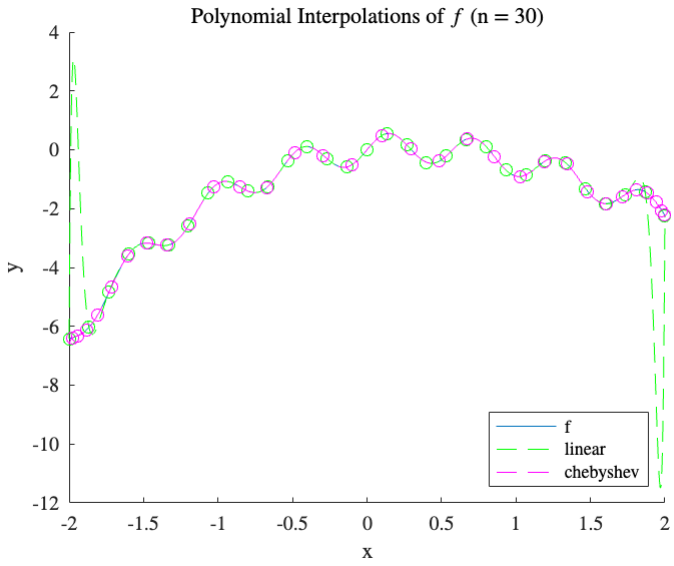



```
------------ n = 20 ------------
max linear error: 238.18072
max chebyshev error: 62.48382
--------------------------------
```






```
------------ n = 25 ------------
max linear error: 104.96207
max chebyshev error: 0.01615
--------------------------------
```




```
------------ n = 30 ------------
max linear error: 9.49873
max chebyshev error: 0.19624
--------------------------------
```

2. Parametric polynomial interpolation of linearly spaced points with Neville's method

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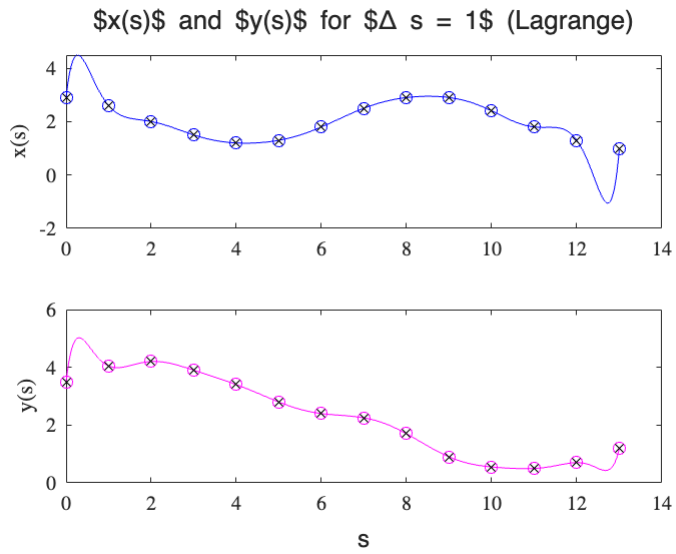
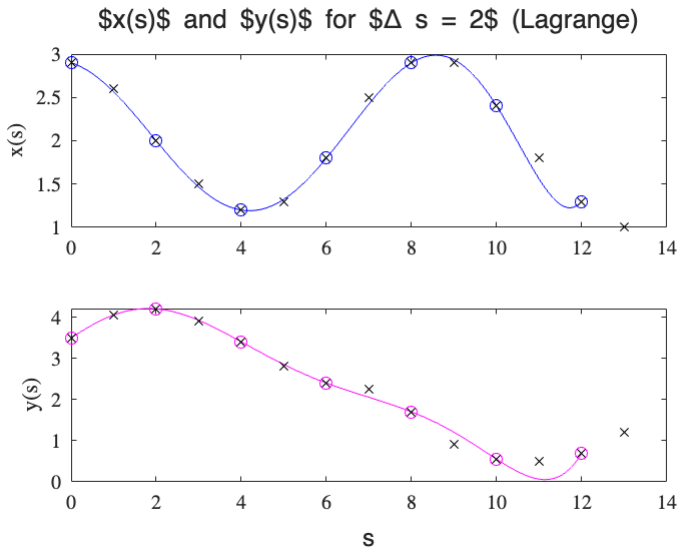
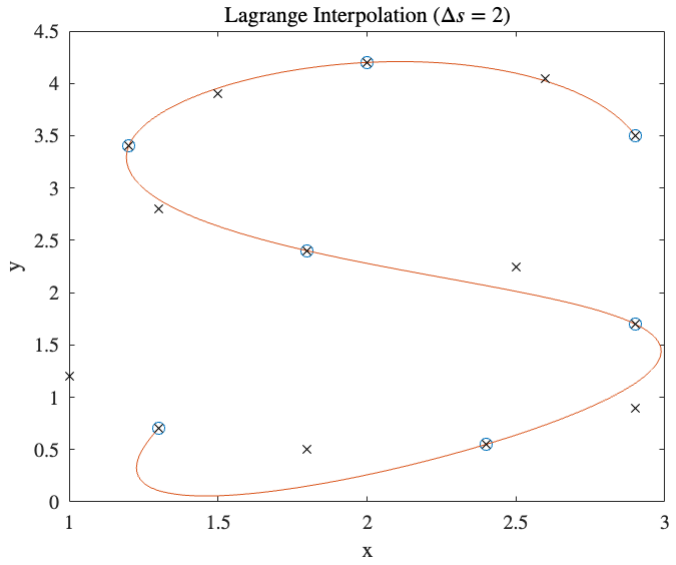
main2
```

```
------ ds = 1, (n = 13) ------
min x: -1.04884, max x: 4.48896
min y: 0.42885, max y: 5.02324
--------------------------------
```

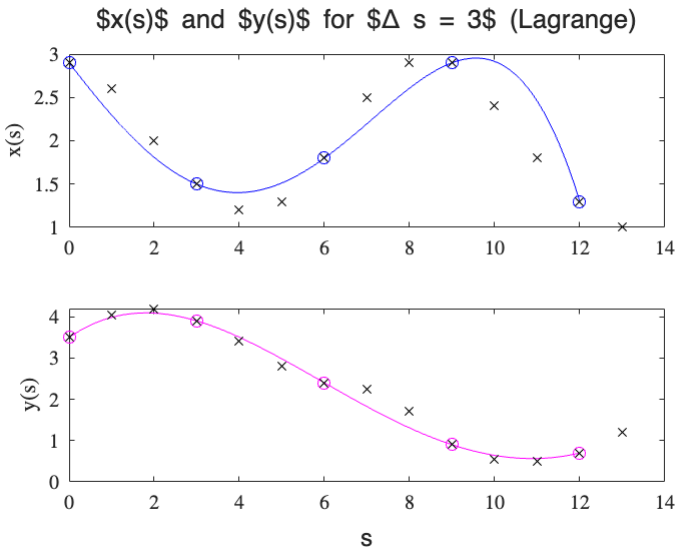


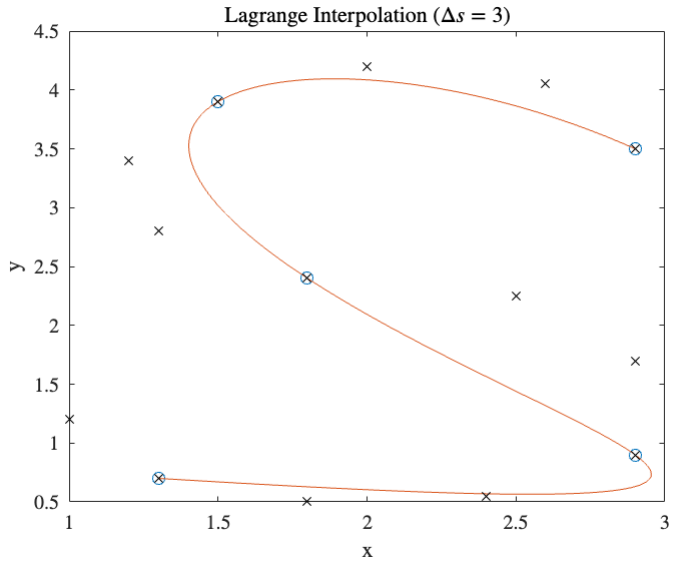

```
------ ds = 2, (n = 6) ------
min x: 1.19263, max x: 2.98710
min y: 0.05646, max y: 4.20808
------------------------------
```



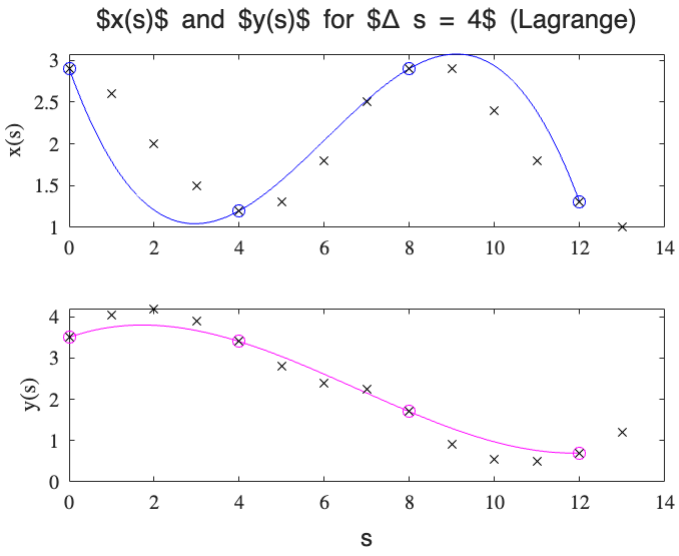


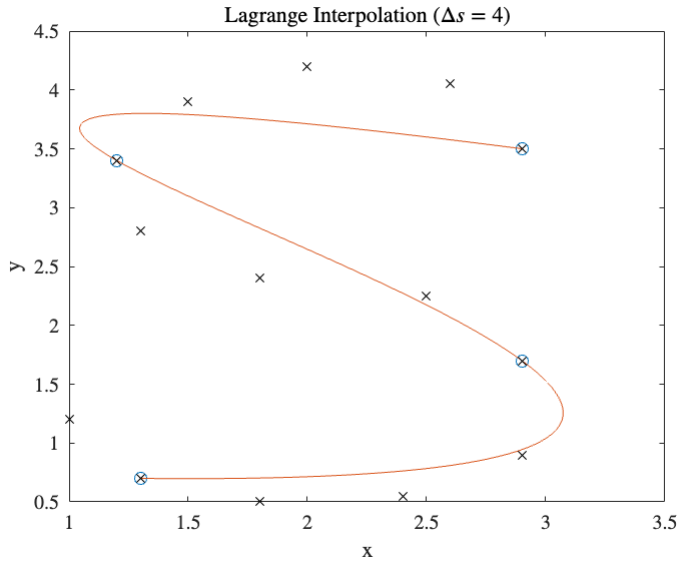

```
------ ds = 3, (n = 4) ------
min x: 1.30000, max x: 2.95407
min y: 0.56513, max y: 4.09457
------------------------------
```



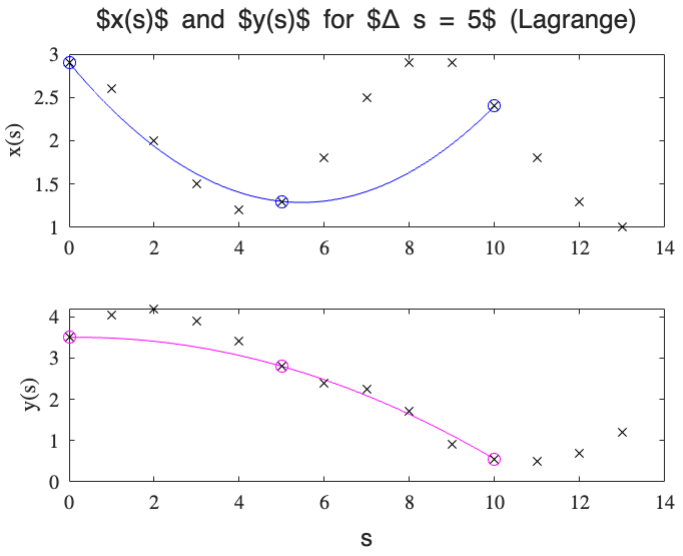


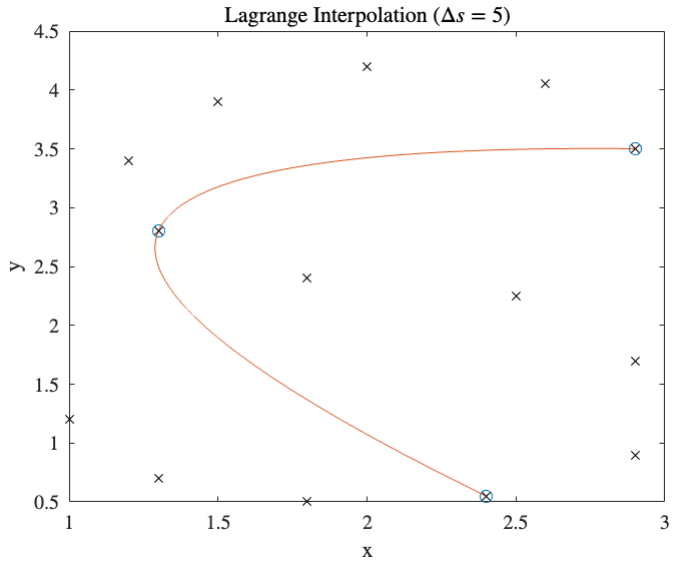

```
------ ds = 4, (n = 3) ------
min x: 1.04421, max x: 3.07283
min y: 0.69771, max y: 3.80059
------------------------------
```



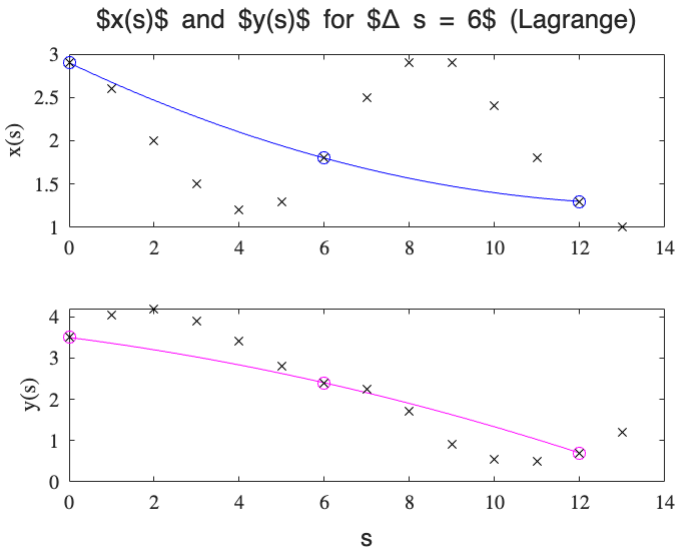


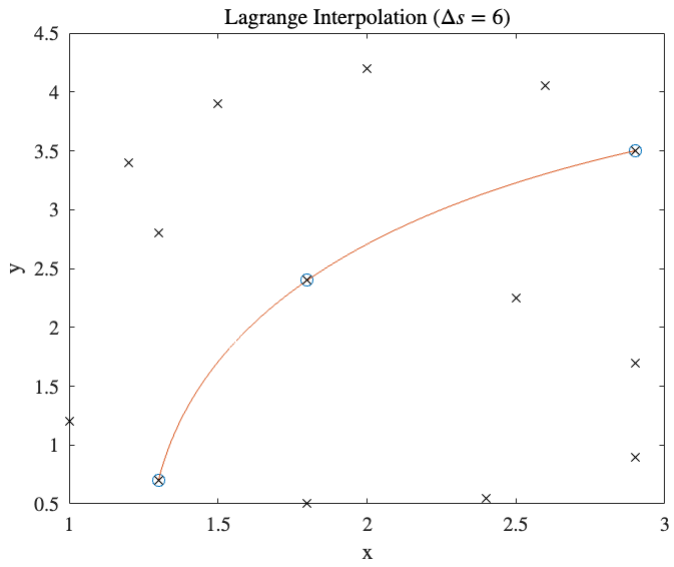

```
------ ds = 5, (n = 2) ------
min x: 1.28843, max x: 2.90000
min y: 0.55000, max y: 3.50181
------------------------------
```






```
------ ds = 6, (n = 2) ------
min x: 1.30000, max x: 2.90000
min y: 0.70000, max y: 3.50000
------------------------------
```

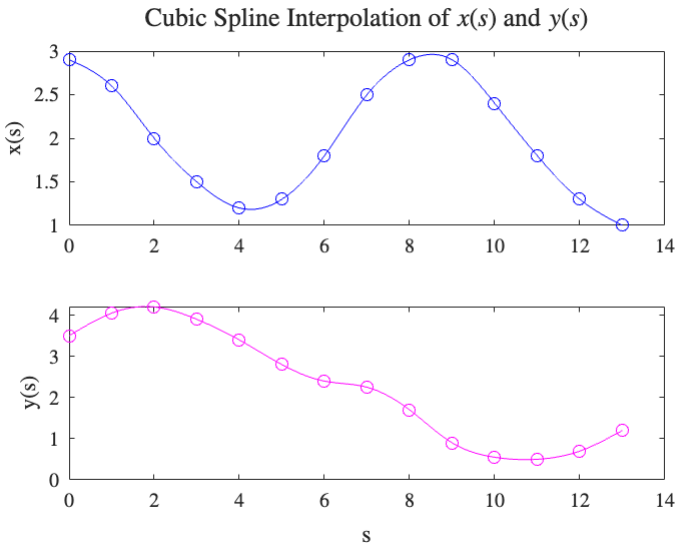


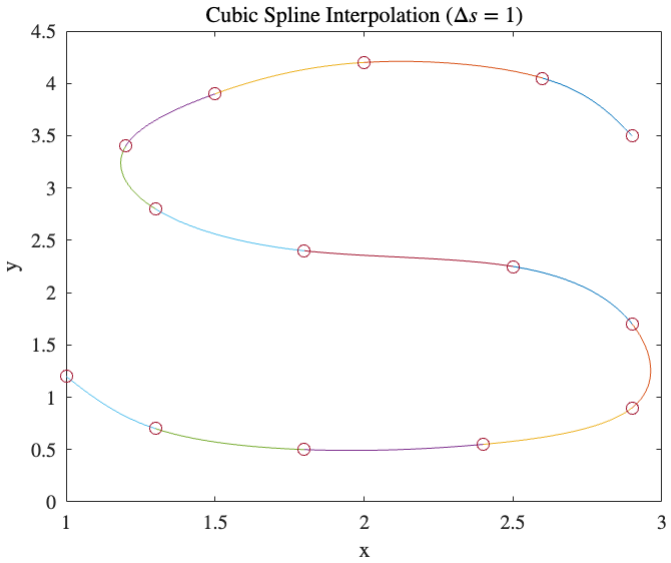


3. Parametric cubic spline interpolation

```
main3
```

```
------ ds = 1 ------
min x: 1.00000, max x: 2.96208
min y: 0.49191, max y: 4.21027
```




Cubic Spline Interpolation ($\Delta s = 1$)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
y
1
1.5
2
2.5
3
x