

Task 1.3

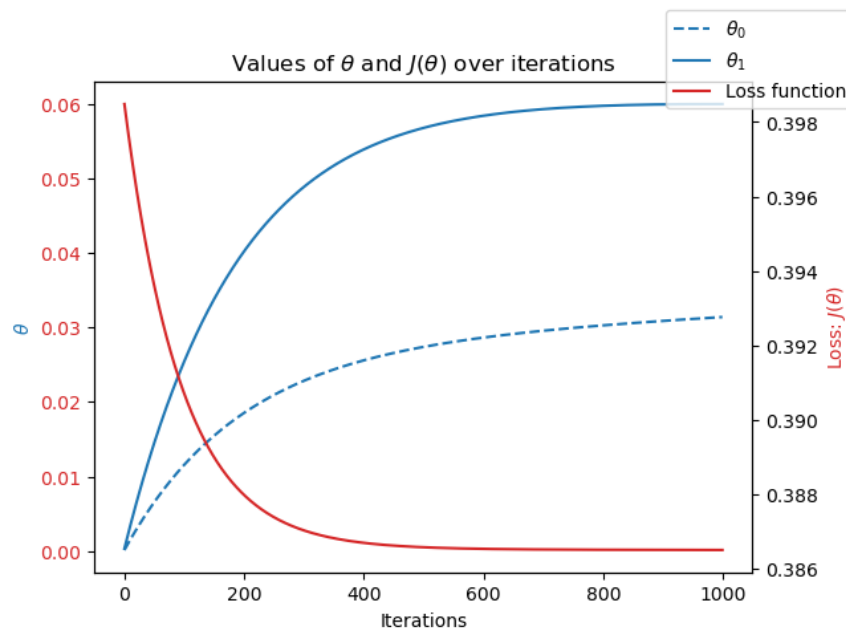
Düsseldorf, 1990

Theta0: 0

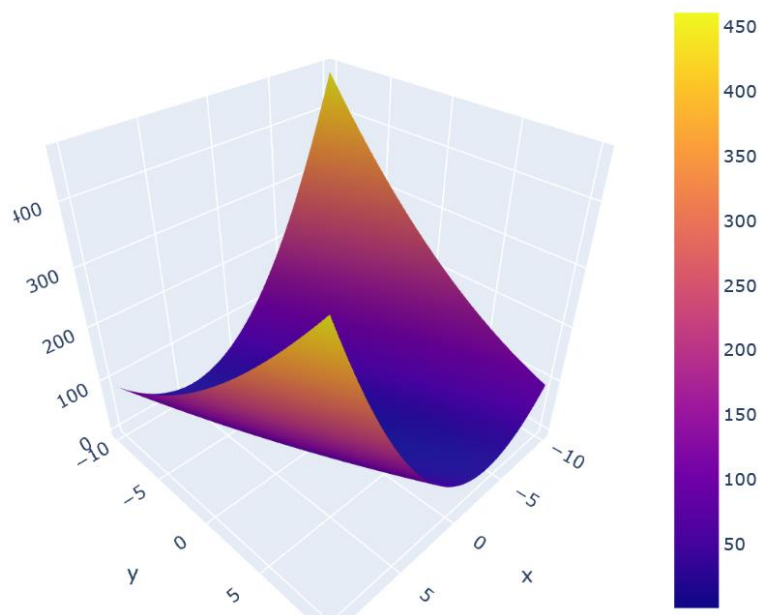
Theta1: 0

Step size: 0.001

Number of iterations: 1000



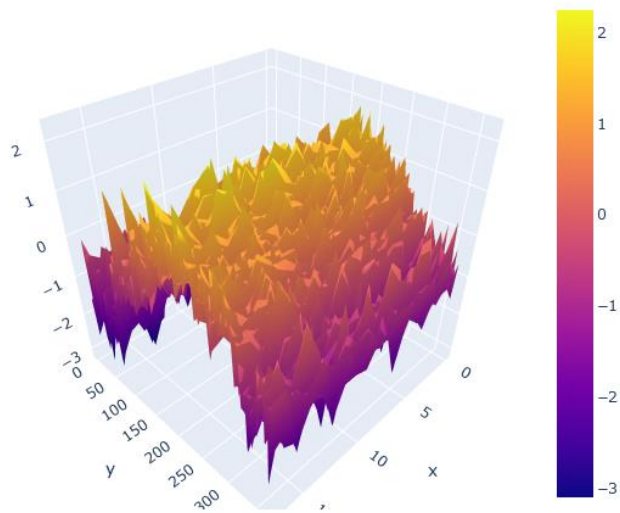
Loss function for different thetas



Mean Temperatures for 1965

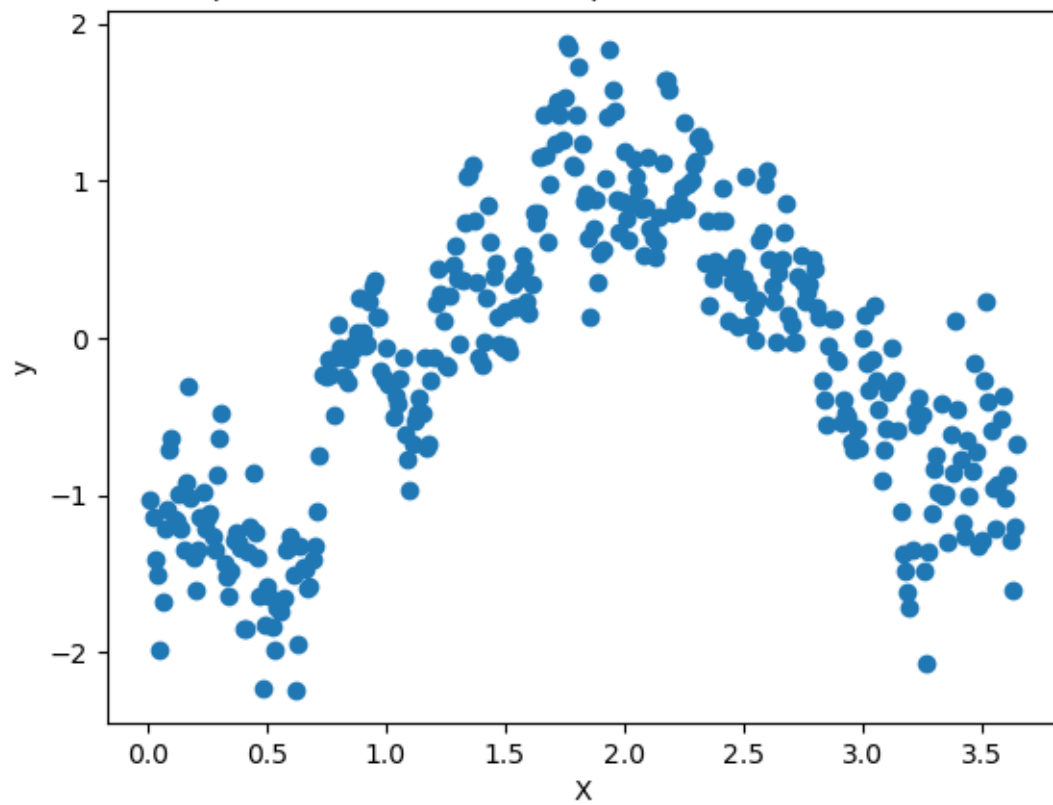
All weather stations

Temperatures over year 1965



Basel

Input dataset - Mean temperatures in Basel, 1965

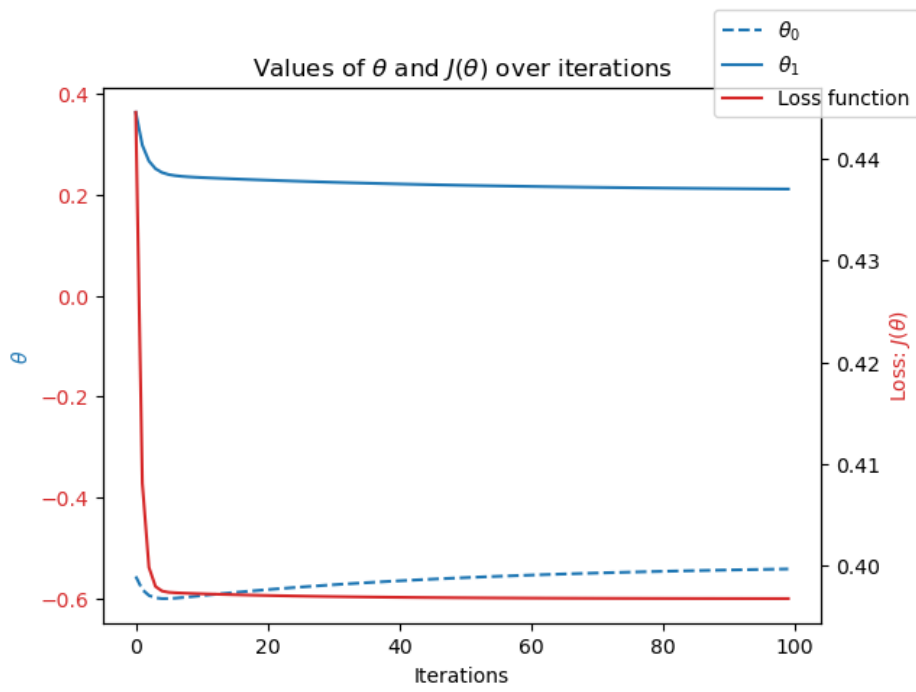


Theta0: -0.5

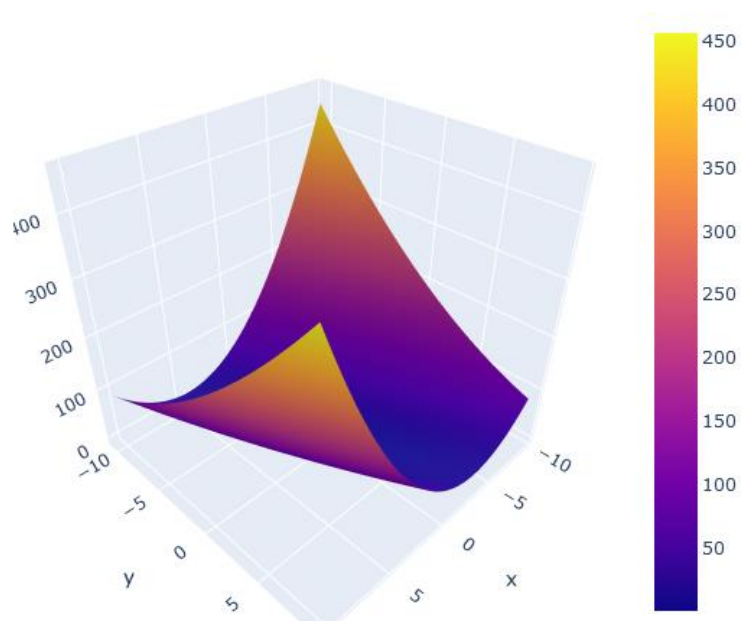
Theta1: 0.5

Step size: 0.1

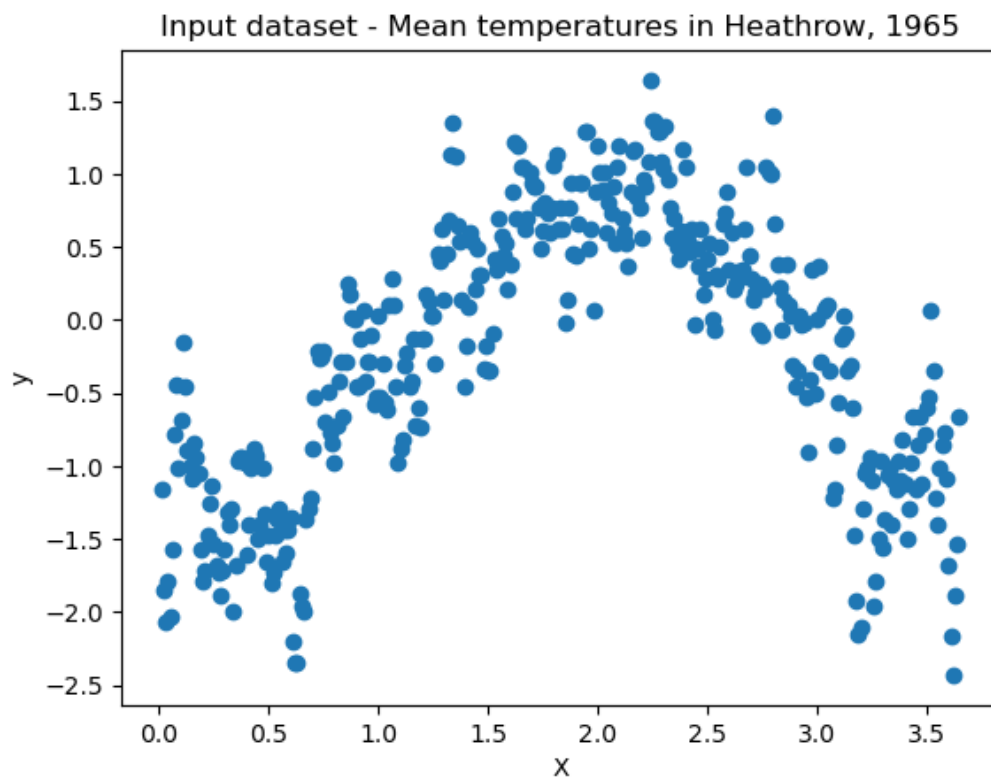
Number of iterations: 200



Loss function for different thetas



Heathrow

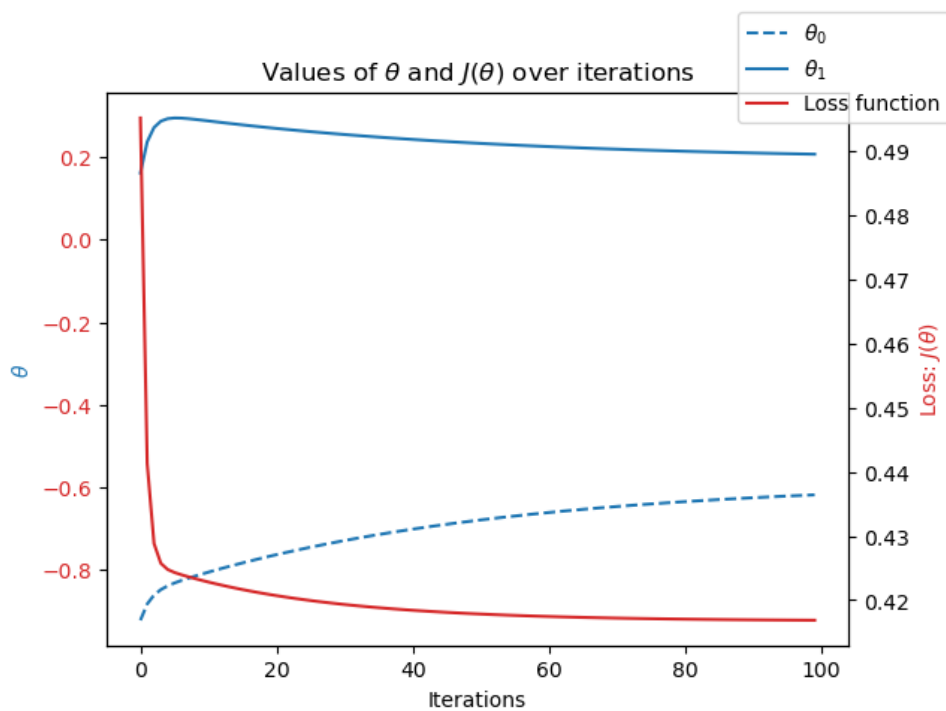


Theta0: -1

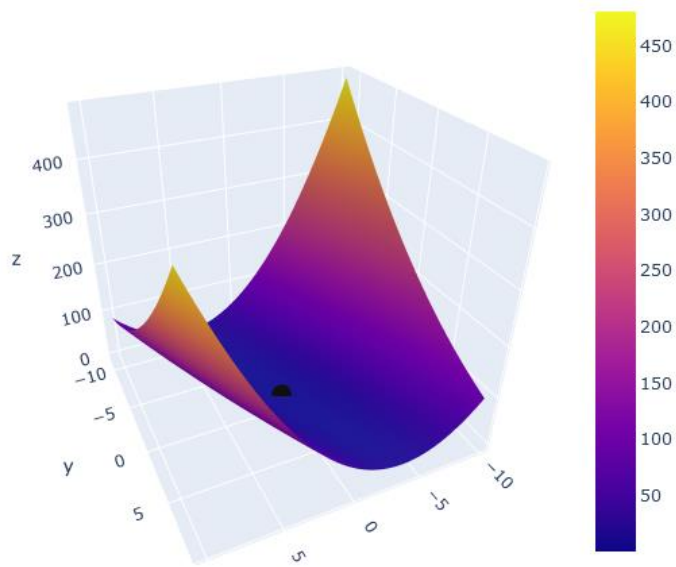
Theta1: 0

Step size: 0.1

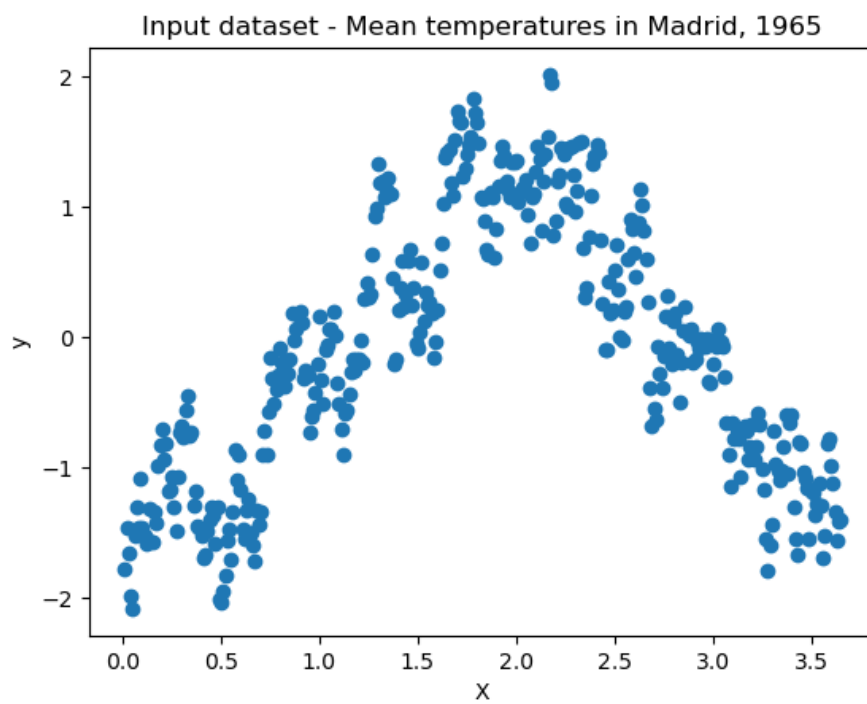
Number of iterations: 100



Loss function for different thetas



Madrid

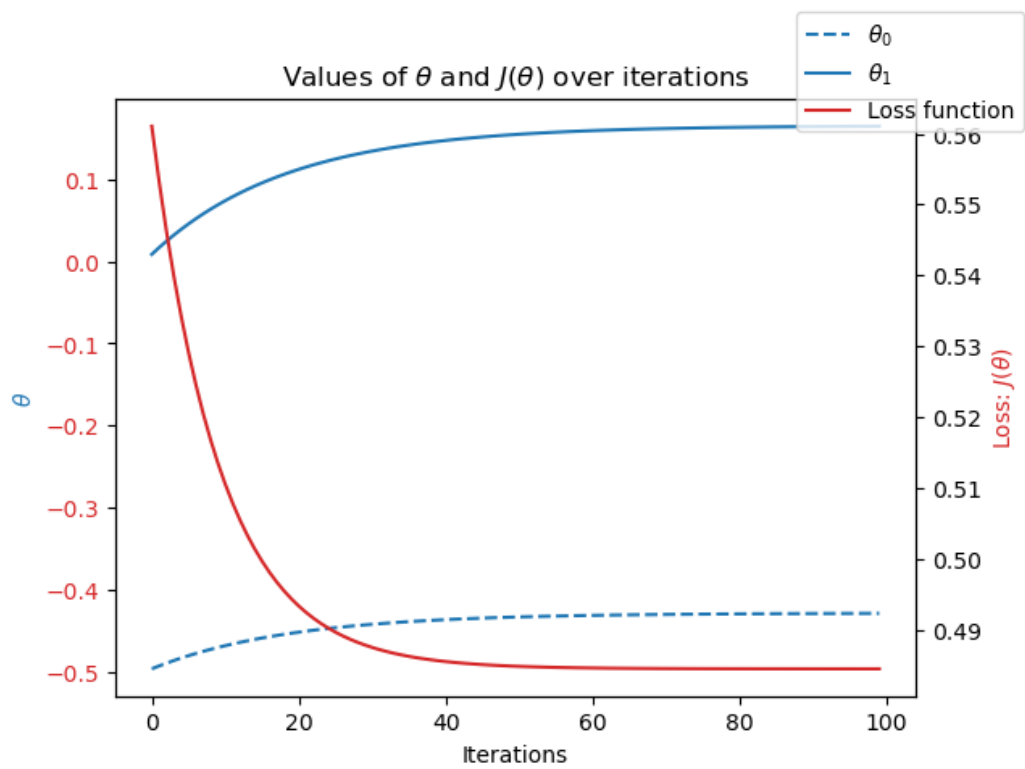


Theta0: -0.5

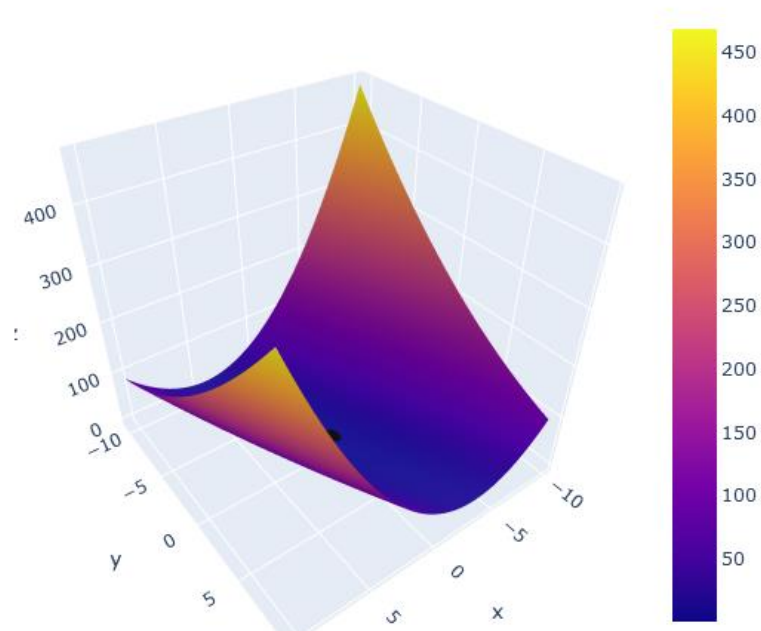
Theta1: 0

Step size: 0.01

Number of iterations: 100



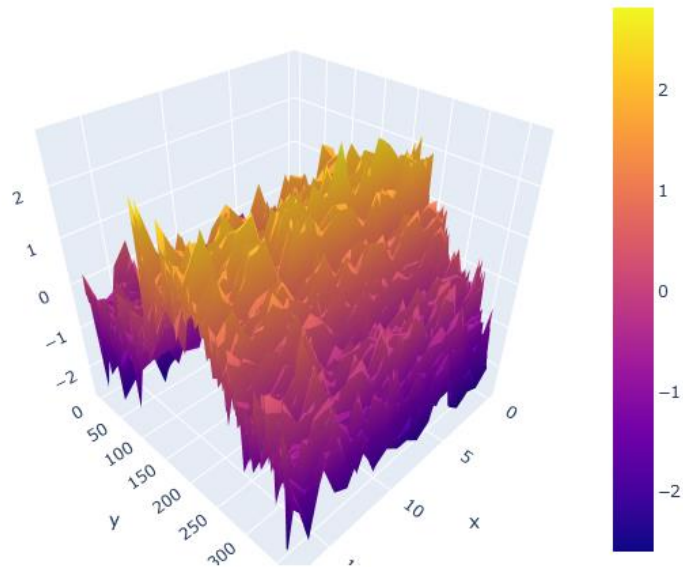
Loss function for different thetas



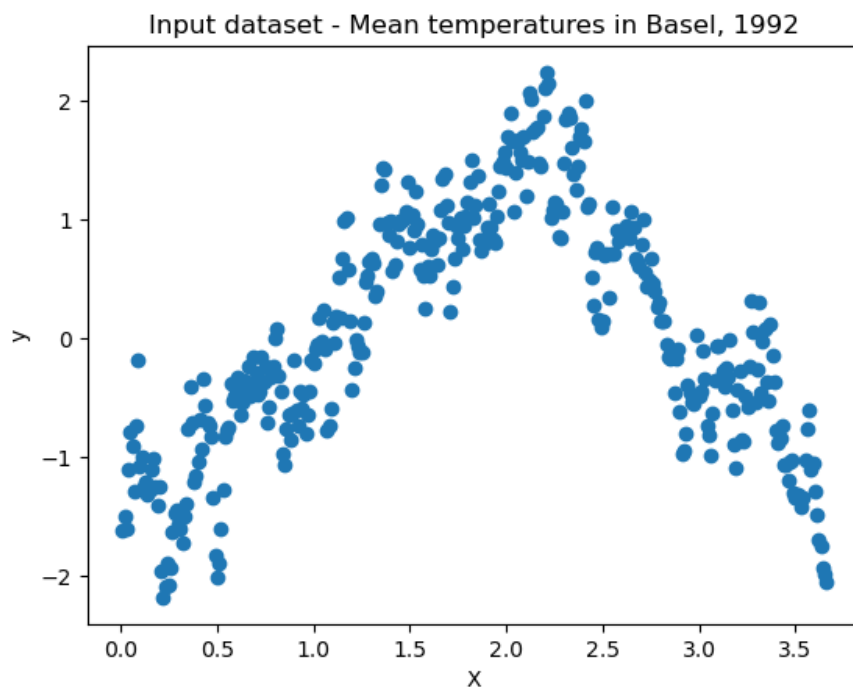
Mean Temperatures for 1992

All weather stations

Temperatures over year 1992



Basel

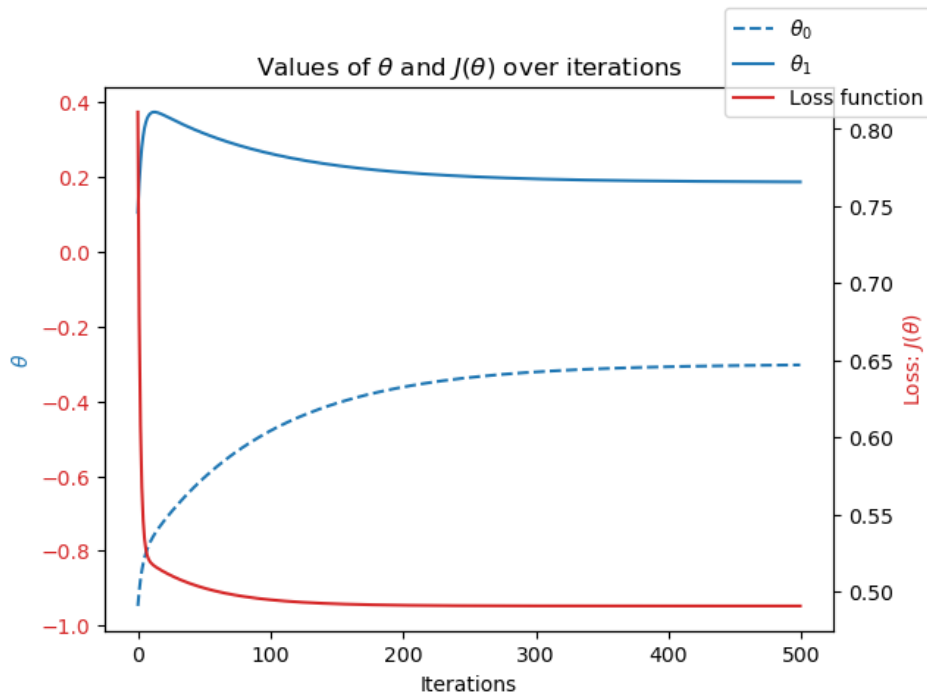


Theta0: -1

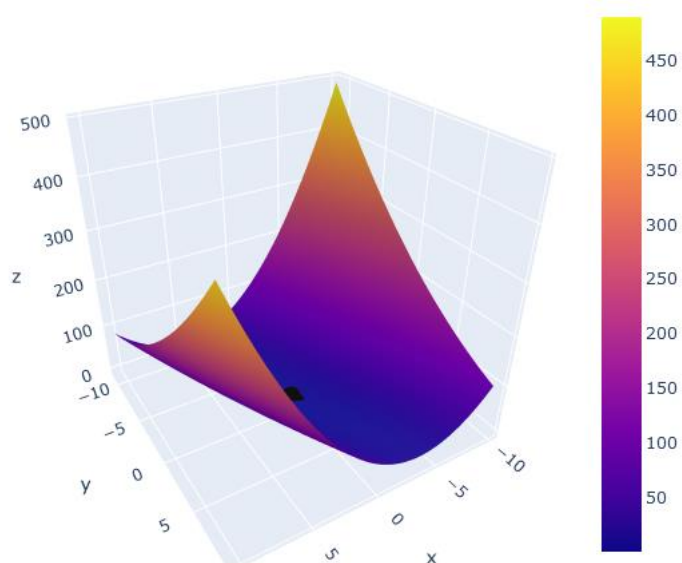
Theta1: 0

Step size: 0.05

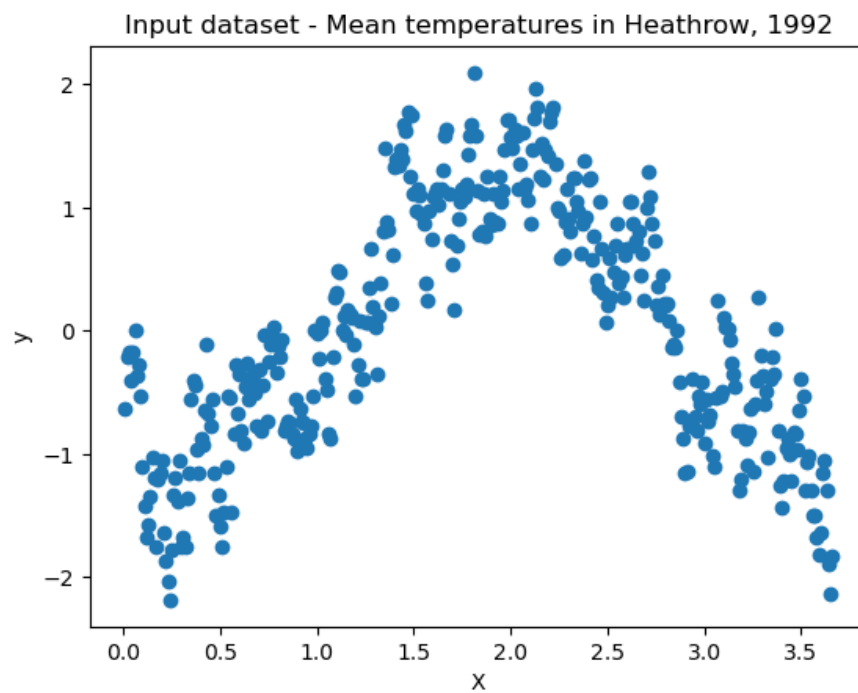
Number of iterations: 500



Loss function for different thetas



Heathrow

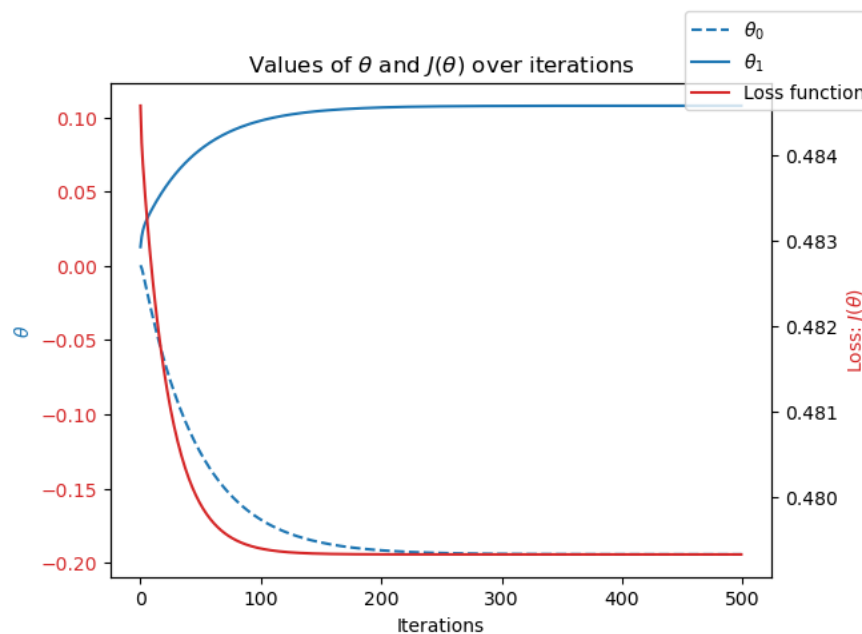


Theta0: 0

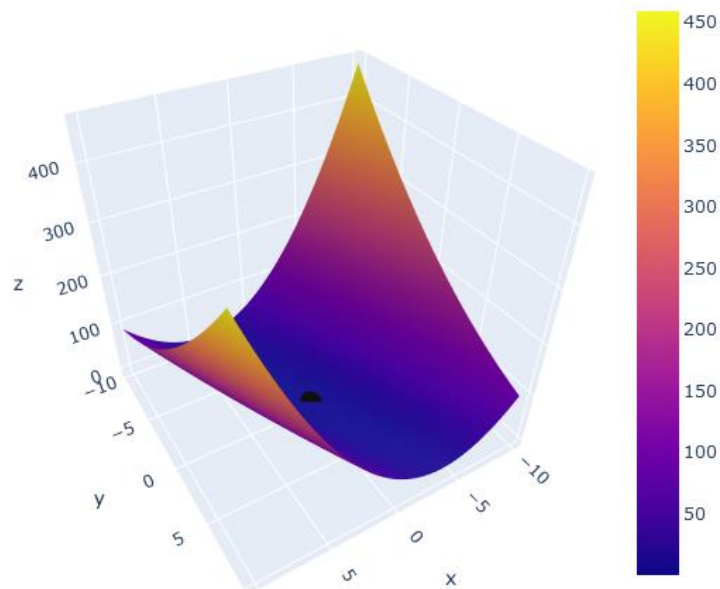
Theta1: 0

Step size: 0.1

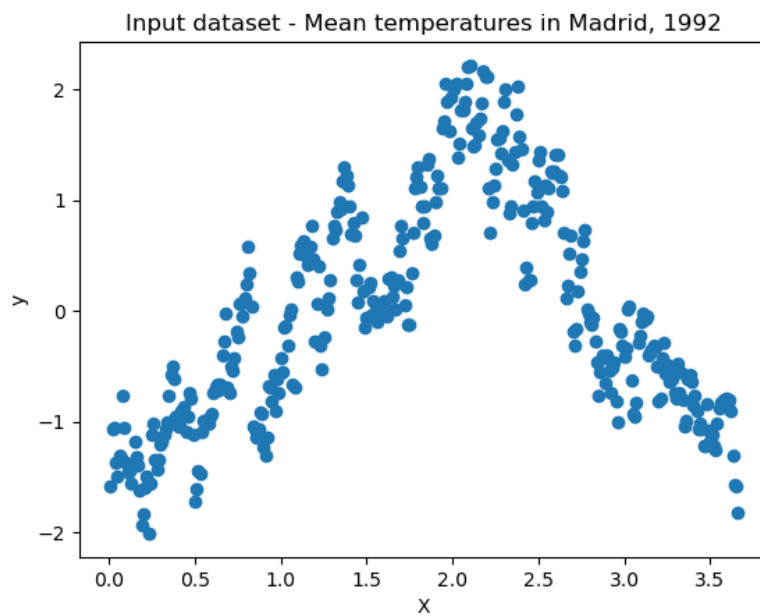
Number of iterations: 500



Loss function for different thetas



Madrid

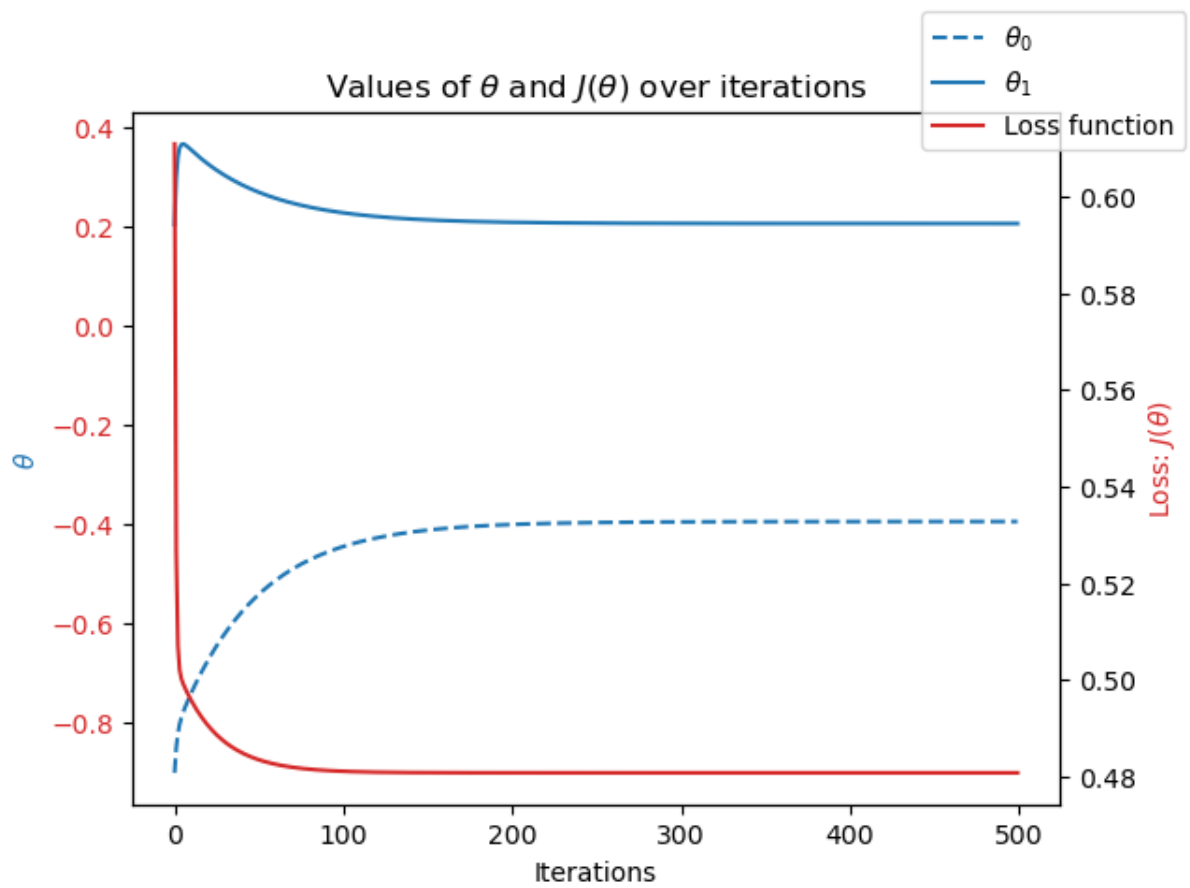


Theta0: -1

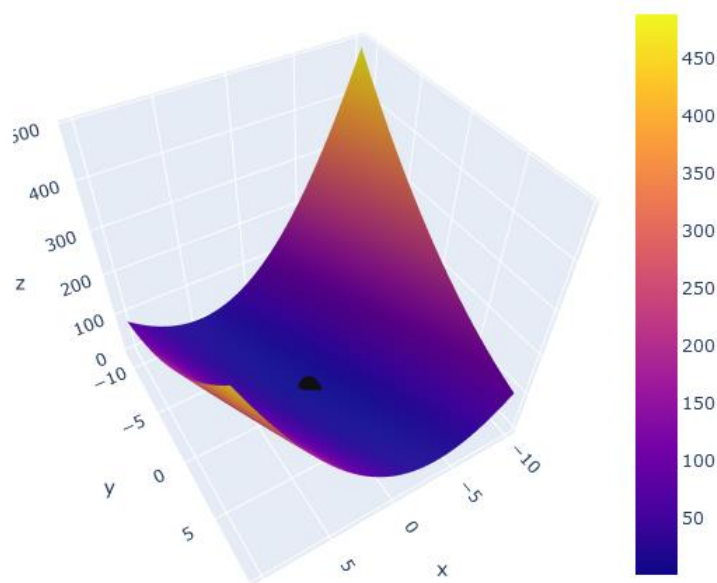
Theta1: 0

Step size: 0.1

Number of iterations: 500



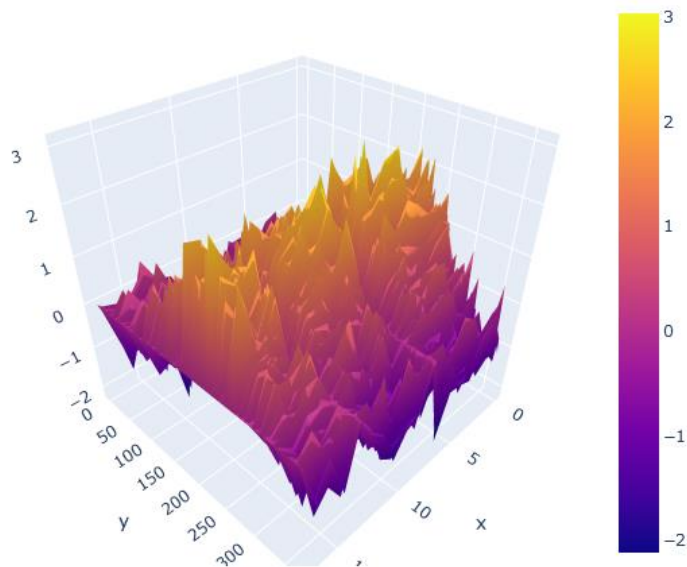
Loss function for different thetas



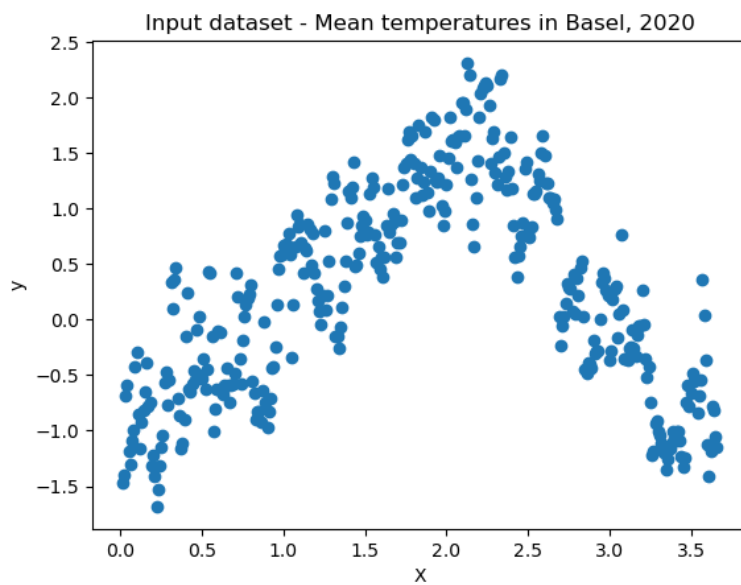
Mean Temperatures for 2020

All weather stations

Temperatures over year 2020



Basel

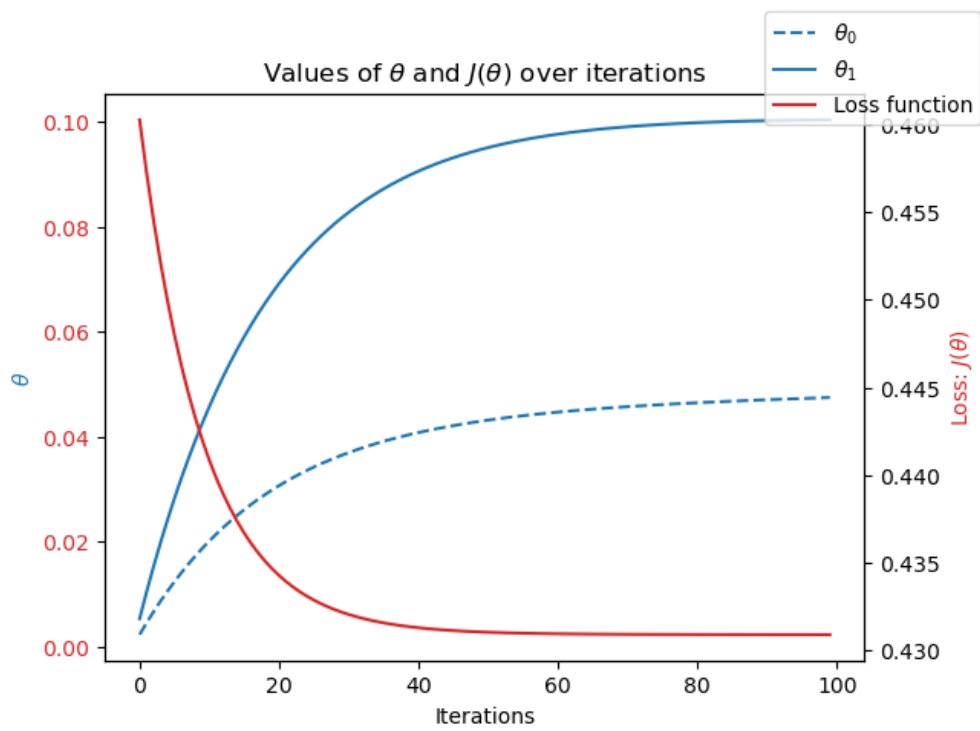


Theta0: 0

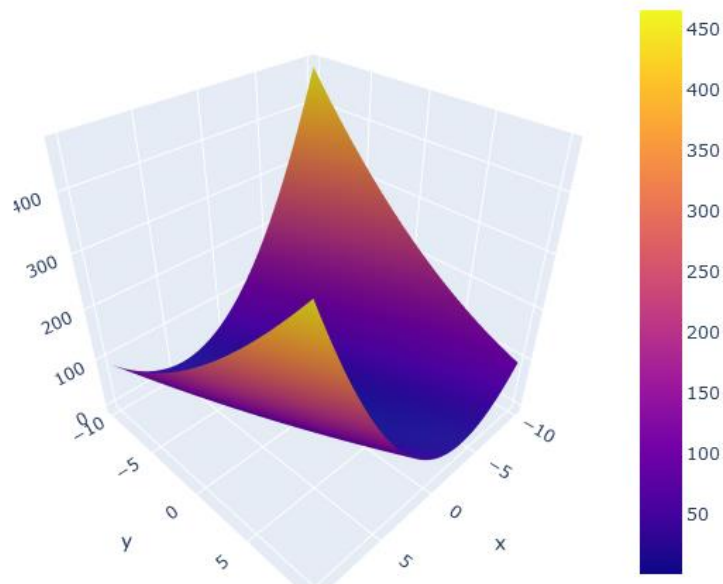
Theta1: 0

Step size: 0.01

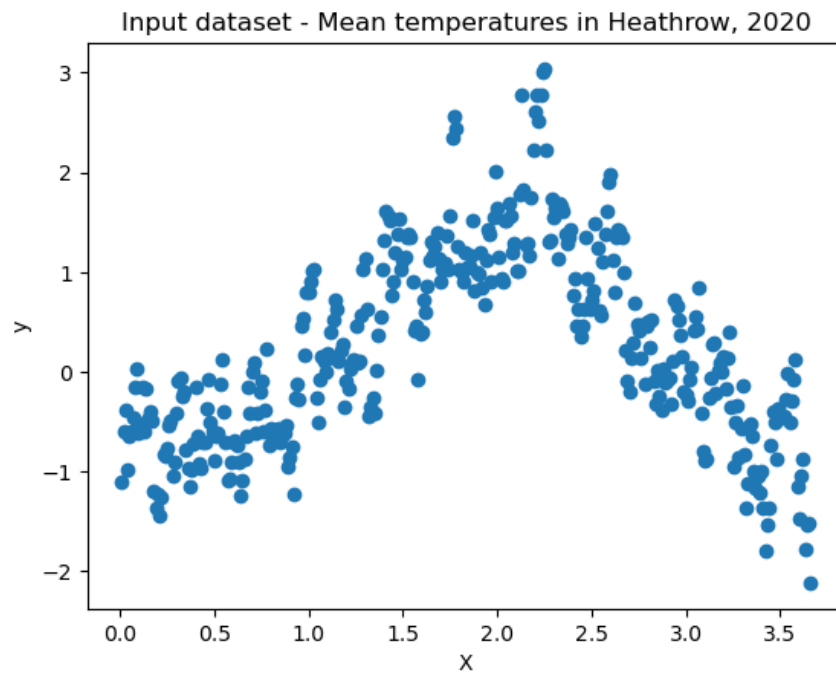
Number of iterations: 100



Loss function for different thetas



Heathrow

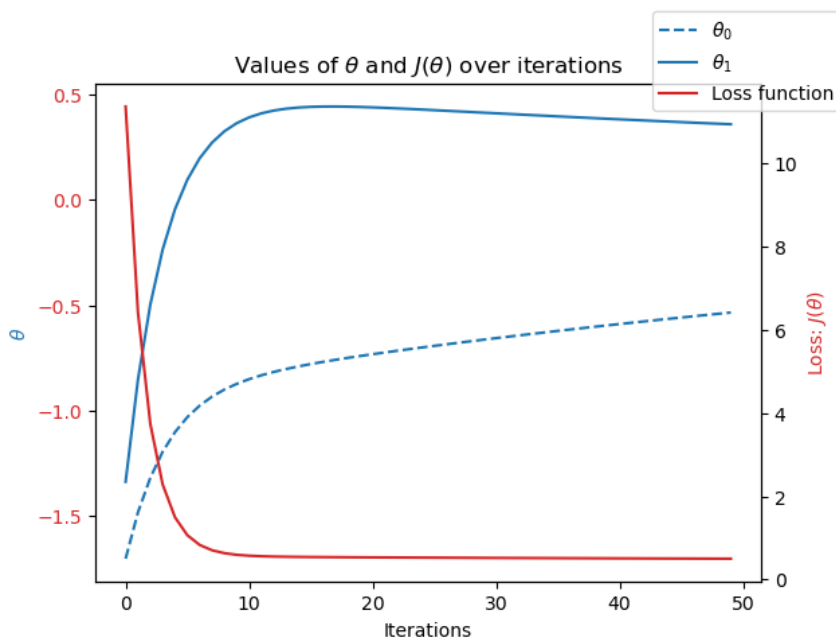


Theta0: -2

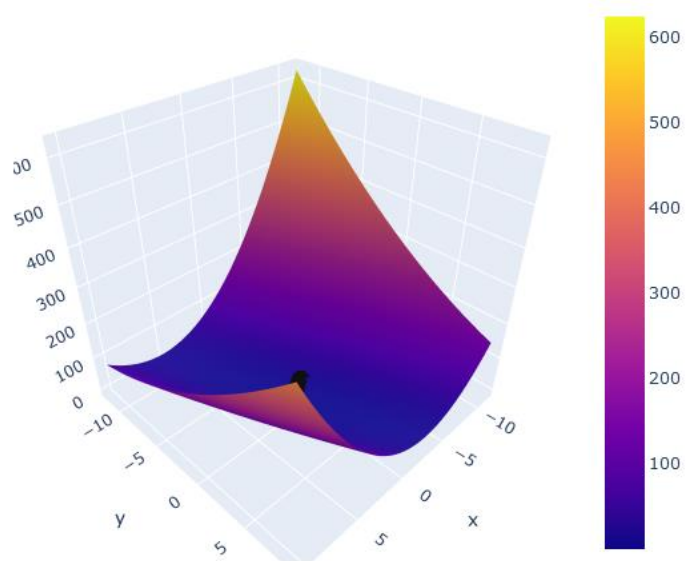
Theta1: -2

Step size: 0.05

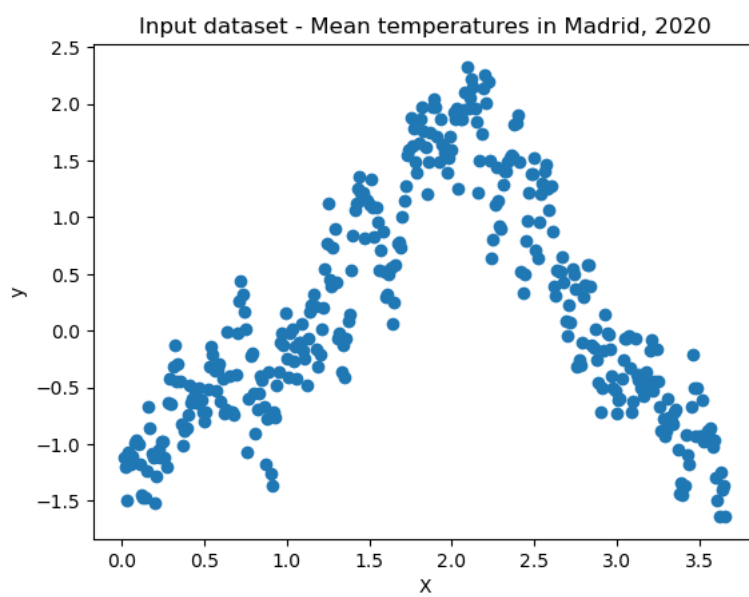
Number of iterations: 50



Loss function for different thetas



Madrid

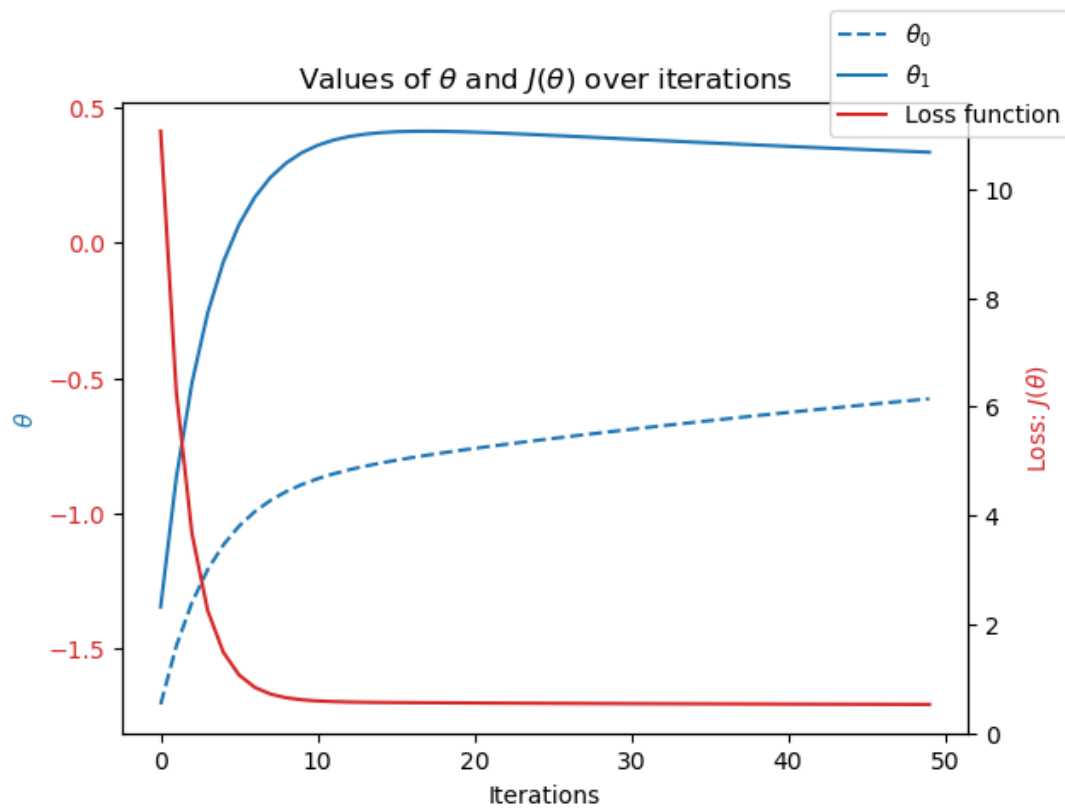


Theta0:-2

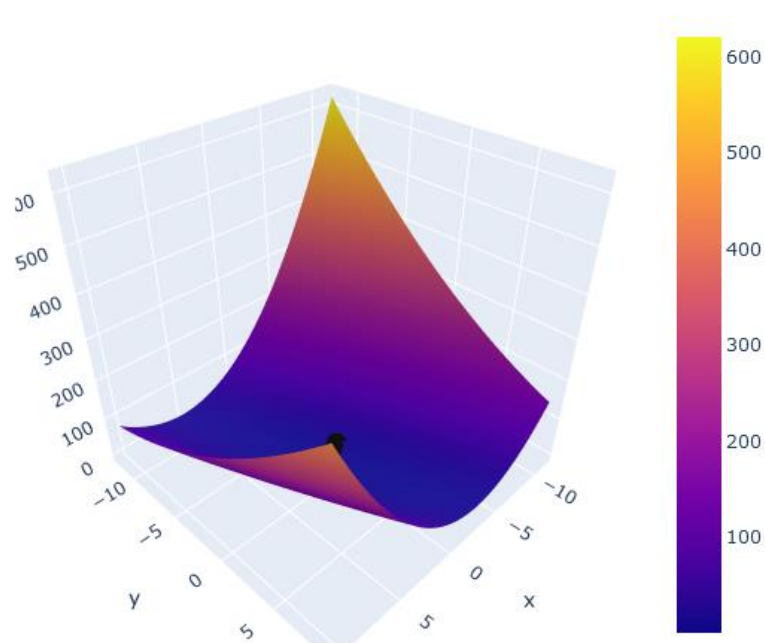
Theta1: -2

Step size: 0.05

Number of iterations: 50



Loss function for different thetas



Observations

Year	Location	Mean temp. min	Mean temp. max	Mean temp. range	Theta0	Theta1	Step size	Nr. of iterations
1965	Basel	-2.24	1.88	4.12	-0.5	0.5	0.1	100
1965	Heathrow	-2.43	1.64	4.07	-1	0	0.1	100
1965	Madrid	-2.08	2.02	4.1	-0.5	0	0.01	100
1992	Basel	-2.19	2.24	4.43	-1	0	0.05	500
1992	Heathrow	-2.19	2.09	4.28	0	0	0.1	500
1992	Madrid	-2.01	2.22	4.23	-1	0	0.1	500
2020	Basel	-1.68	2.31	3.99	0	0	0.01	100
2020	Heathrow	-2.12	3.04	5.16	-2	-2	0.05	50
2020	Madrid	-1.64	2.33	3.97	-2	-2	0.05	50

- All 3 locations experienced increases in mean temperature between 1965, 1992 and 2020. The mean temperature increased the most between 1992 and 2020.
- Heathrow experienced the highest mean temperature out of all 3 locations in 2020. Heathrow also displayed the widest range of mean temperatures for that same year.
- Basel's minimum mean temperature increased greatly between 1992 and 2020, with the 2020 minimum mean temperature close to that of Madrid. Madrid's minimum mean temperature, meanwhile, did not change as much during that same period., nor did Heathrow's.