

1.3 Optimizing Machine Learning

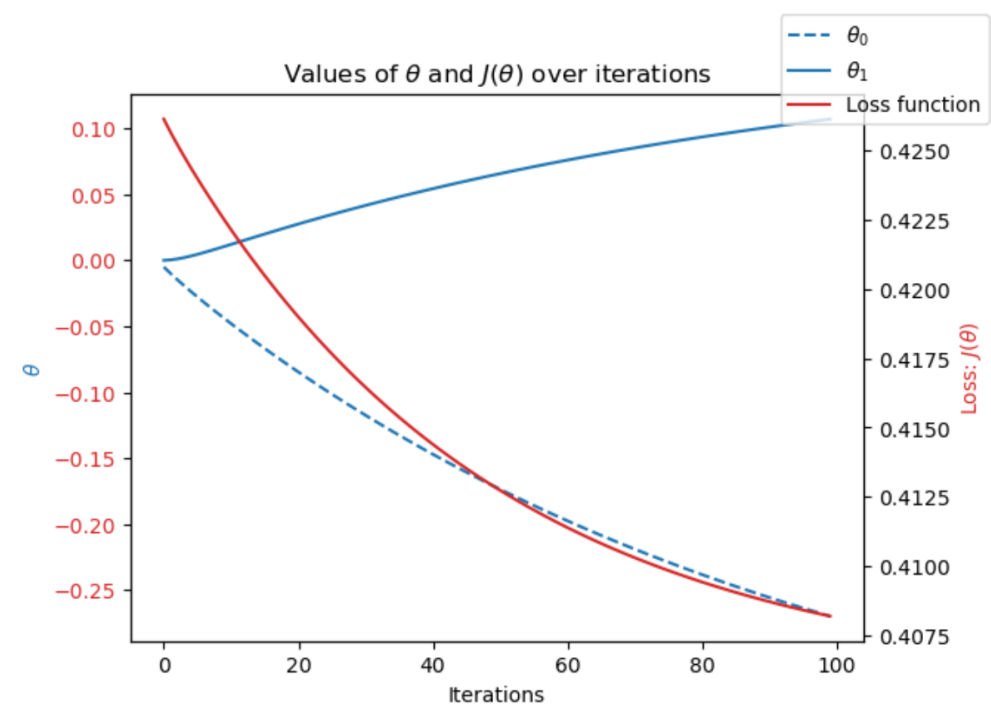
Weather Station	Year	Starting	Ending	Starting	Ending	Starting	Ending	Starting	Ending
		Theta0	Theta0	Theta1	Theta1	Iterations	Iterations	Step Size	Step Size
Budapest	1960	1	1	1	1	100	100	0.05	0.05
Budapest	1988	1	1	1	1	100	100	0.05	0.05
Budapest	2020	1	1	1	1	100	100	0.05	0.05
Heathrow	1960	1	0	1	0	10	100	0.1	0.05
Heathrow	1988	1	1	1	1	100	100	0.05	0.05
Heathrow	2020	1	0.5	1	0.5	100	100	0.05	0.05
Stockholm	1960	1	1	1	1	100	100	0.05	0.05
Stockholm	1988	1	0.5	1	0.5	100	100	0.05	0.05
Stockholm	2020	1	1	1	1	100	100	0.05	0.05

Weather Station	Year	MTemp	Min	Max
Budapest	1960	-0.06	-2.41	1.8
Budapest	1988	-0.046	-2.04	2
Budapest	2020	0.17	-1.58	1.93
Heathrow	1960	-0.1	-2.3	1.74
Heathrow	1988	-0.058	-1.81	1.85
Heathrow	2020	0.24	-2.11	3.03
Stockholm	1960	-0.09	-2.35	1.68
Stockholm	1988	-0.04	-2.19	1.89
Stockholm	2020	0.29	-1.07	2.15

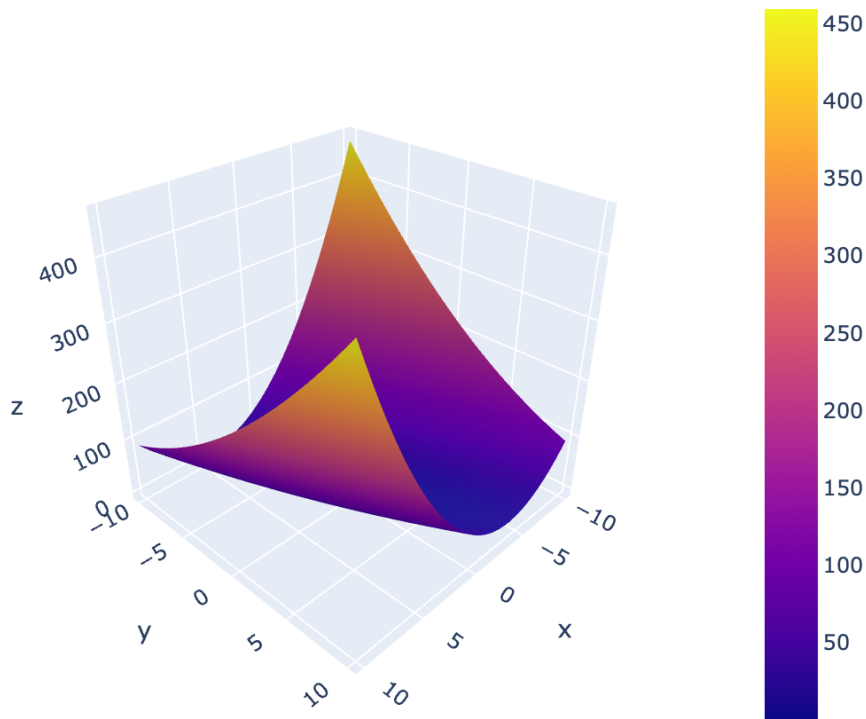
Observations

1. Each station has a much larger mean temperature increase from 1988 to 2020 than 1960 to 1988, which shows that temperature is exponentially rising
2. Stockholm has the largest rise in mean temperature from 1960 to 2020. Of the 3 stations it could be contributing most to temperature rises as its min and max temperatures are consistently higher as the years progress
3. Heathrow has by far the highest max temperature in 2020 (possibly COVID/air traffic related?).
4. Budapest's max temperature decreases from 1988 to 2020, however their min temperature still increases during this period

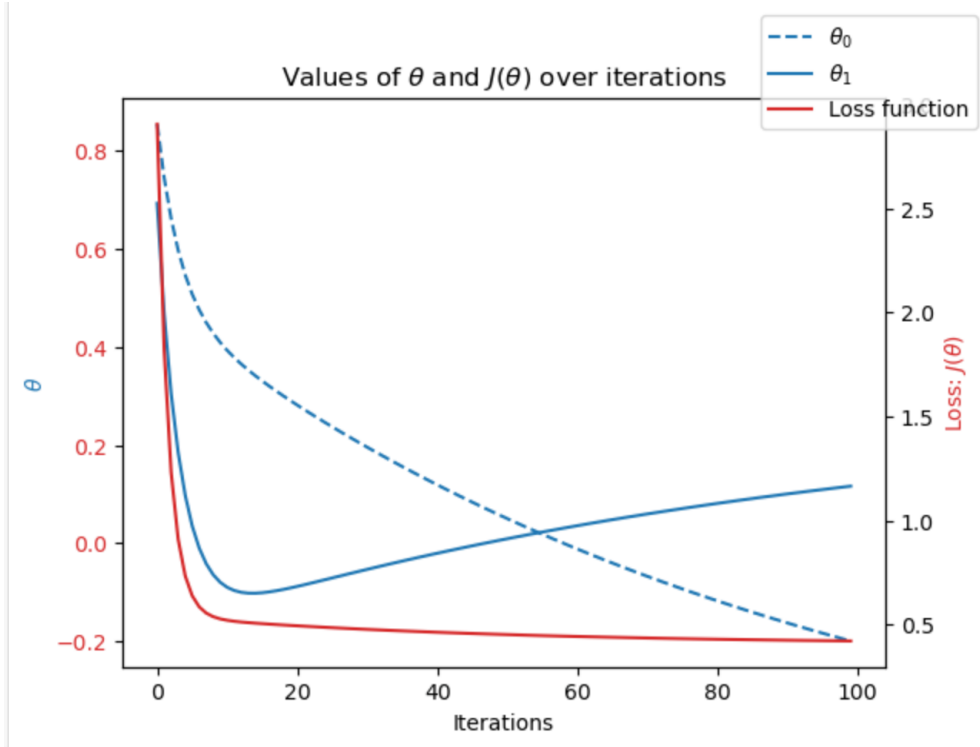
1960 Heathrow



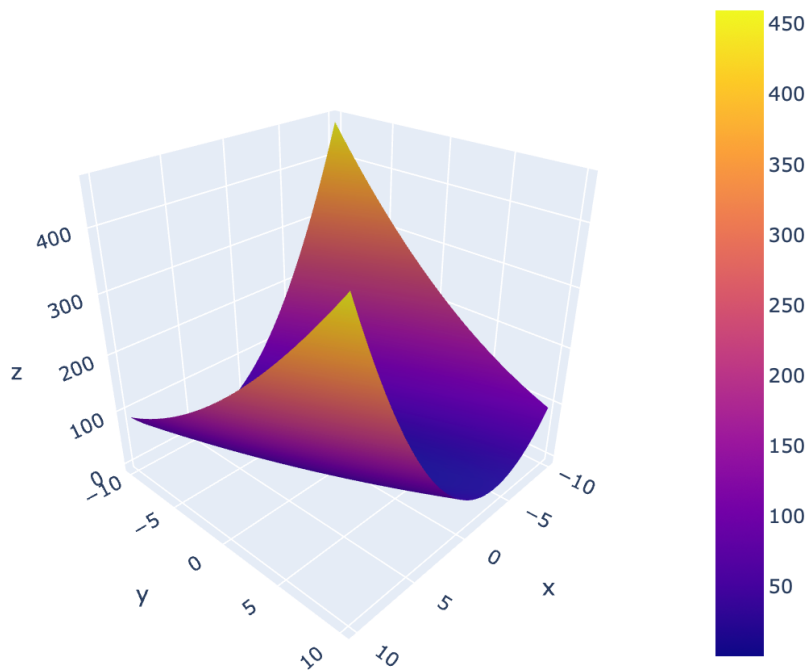
Loss function for different thetas



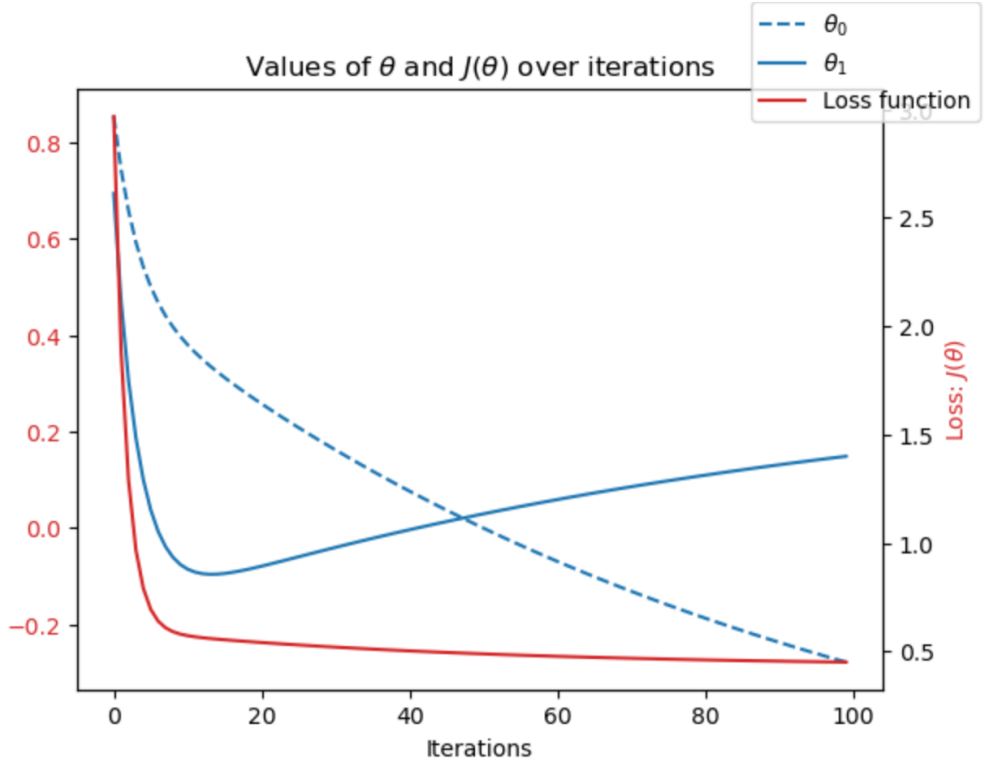
1960 Budapest



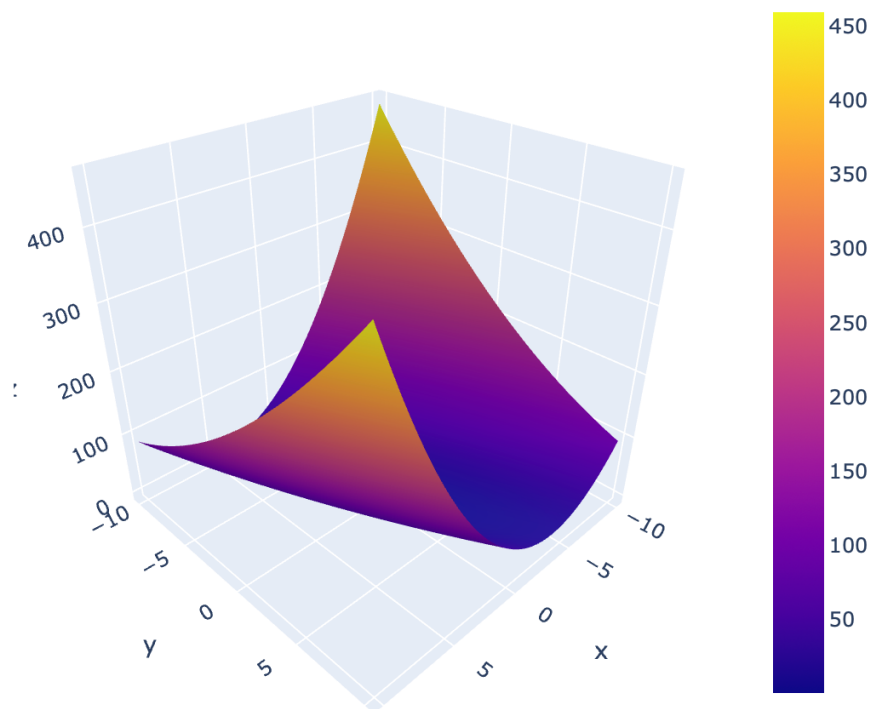
Loss function for different thetas



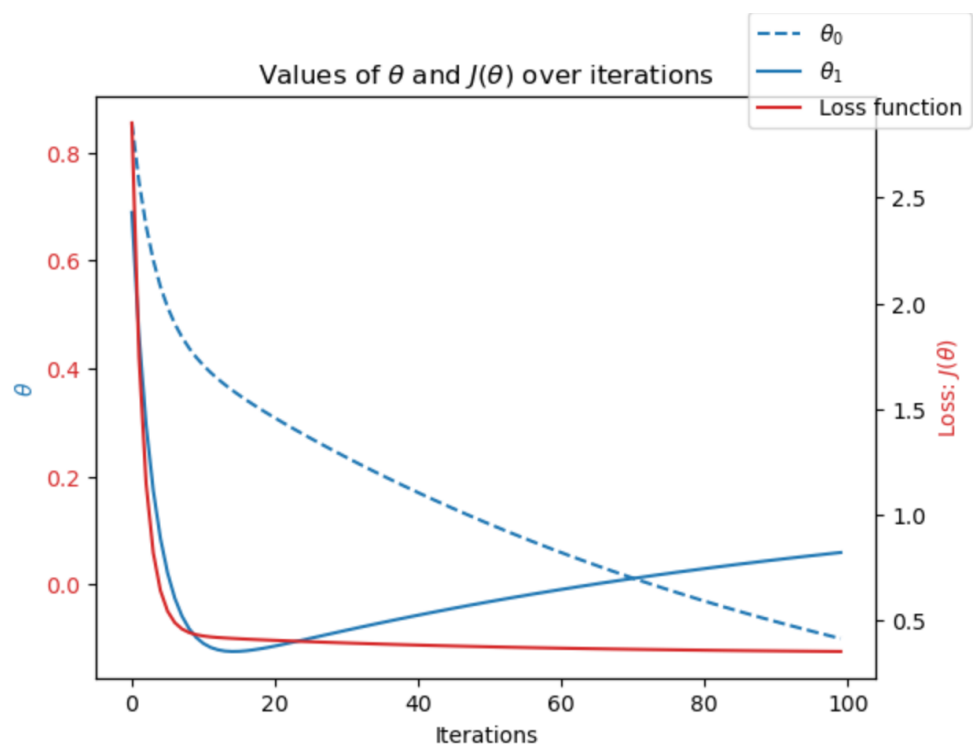
1960 Stockholm



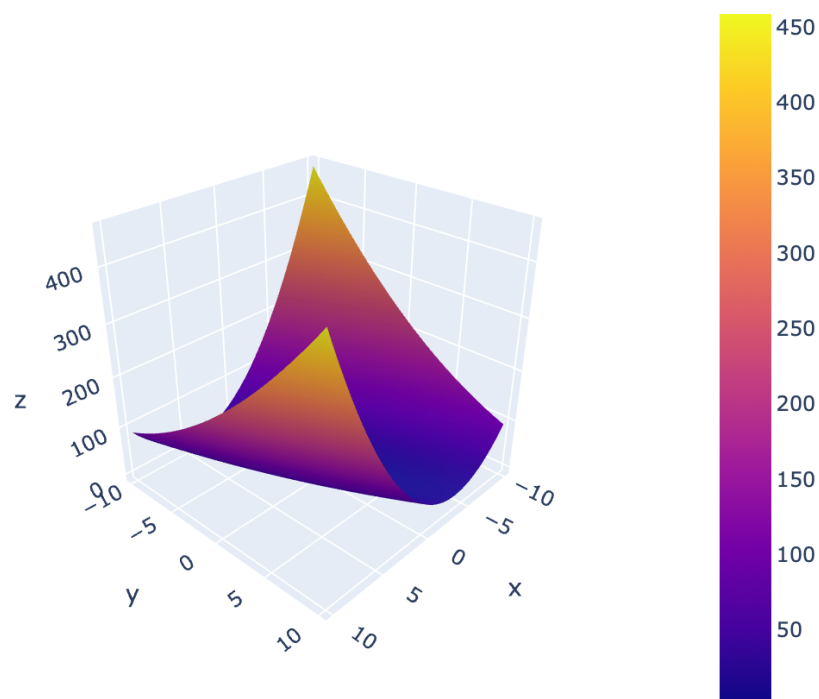
Loss function for different thetas



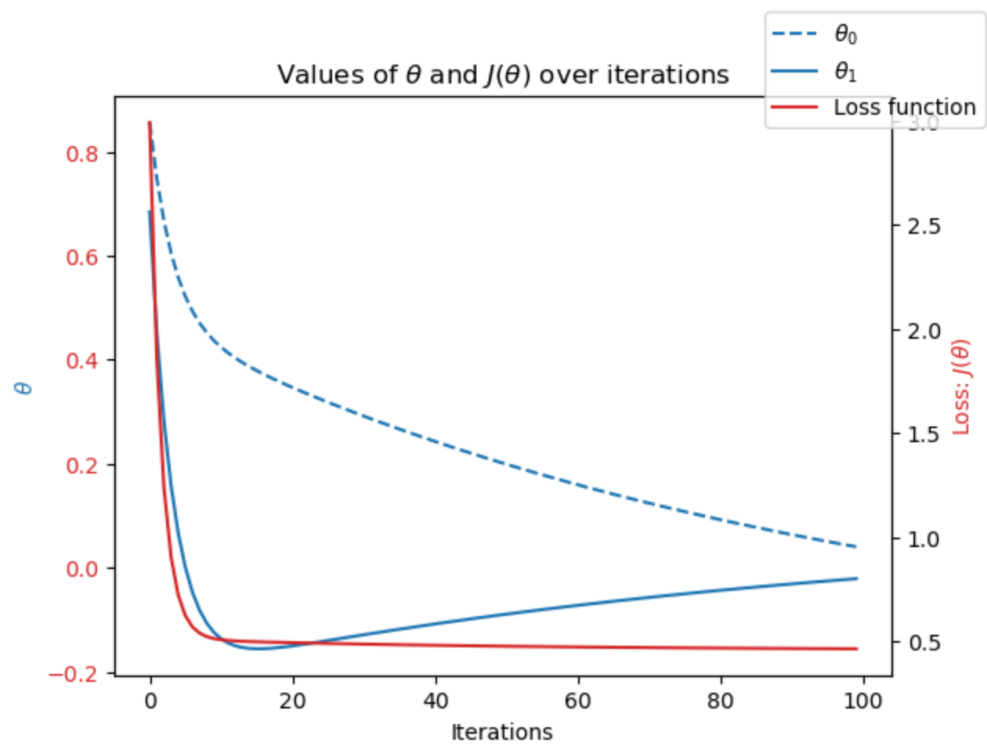
1988 Heathrow



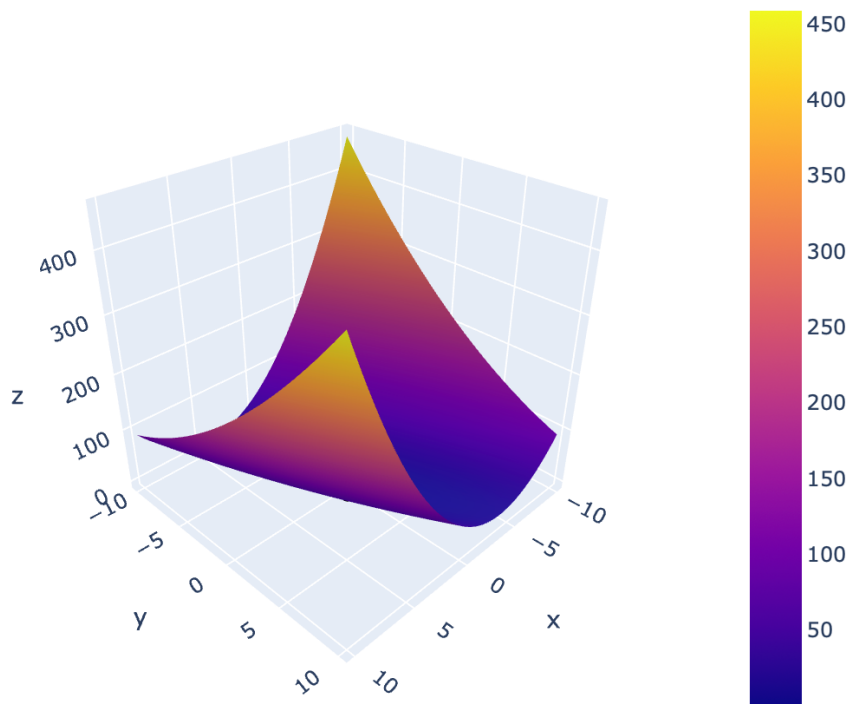
Loss function for different thetas



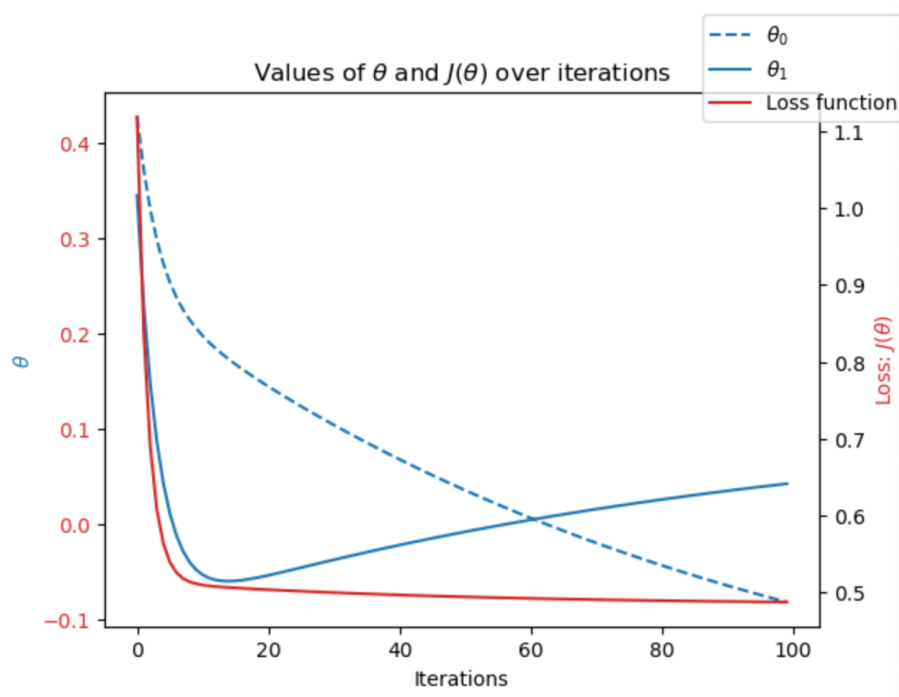
1988 Budapest



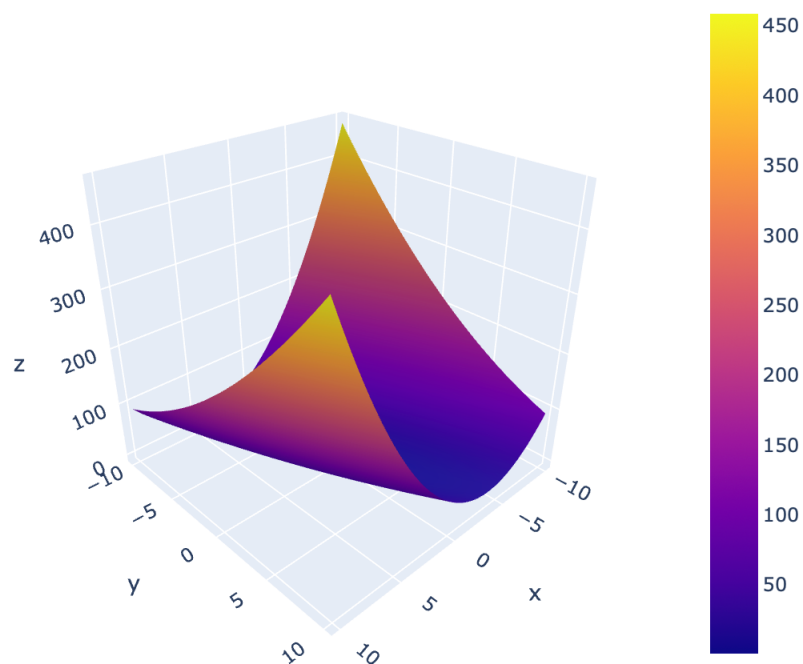
Loss function for different thetas



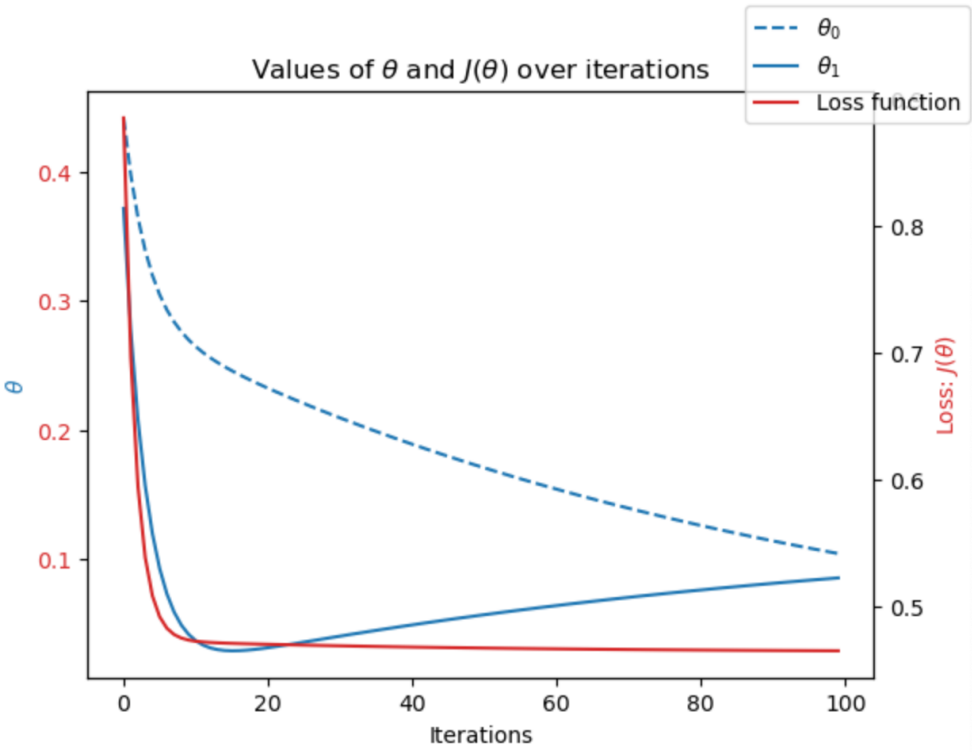
1988 Stockholm



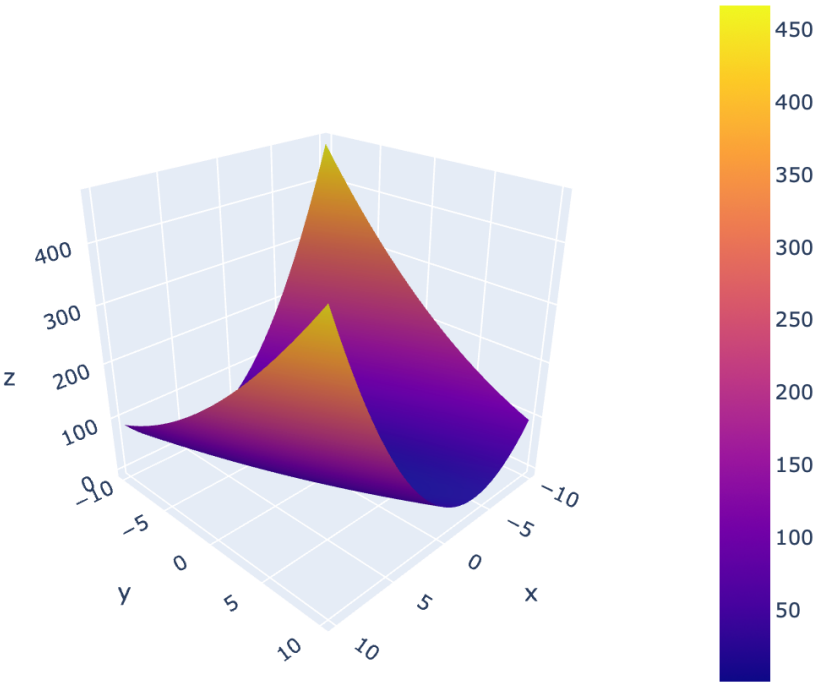
Loss function for different thetas



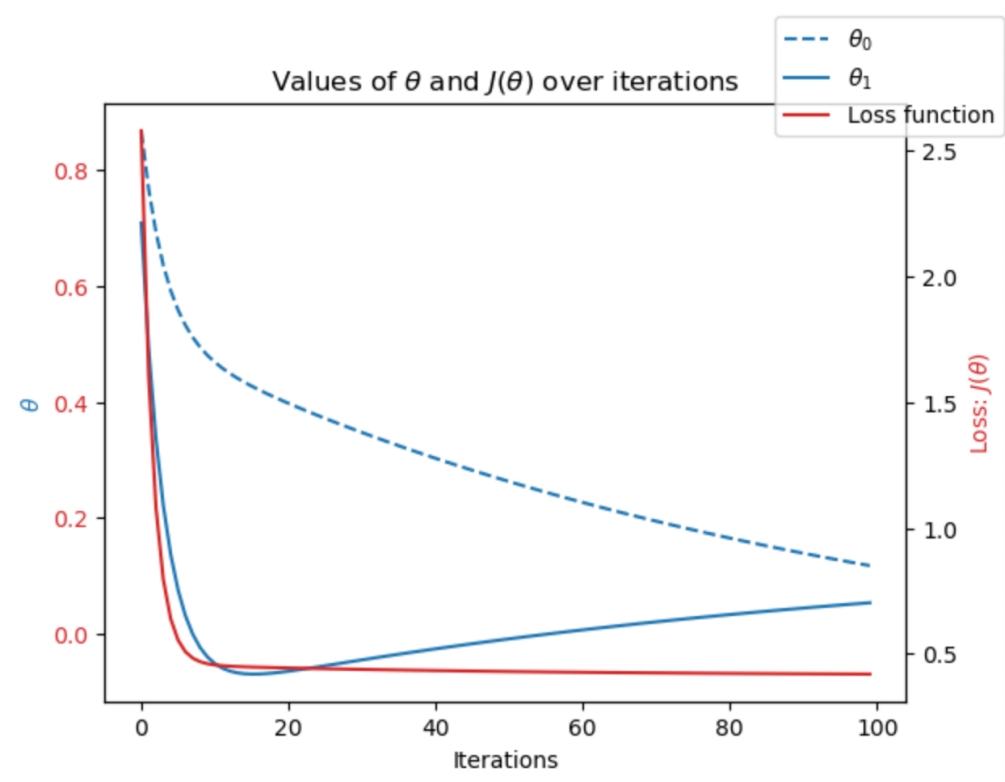
2020 Heathrow



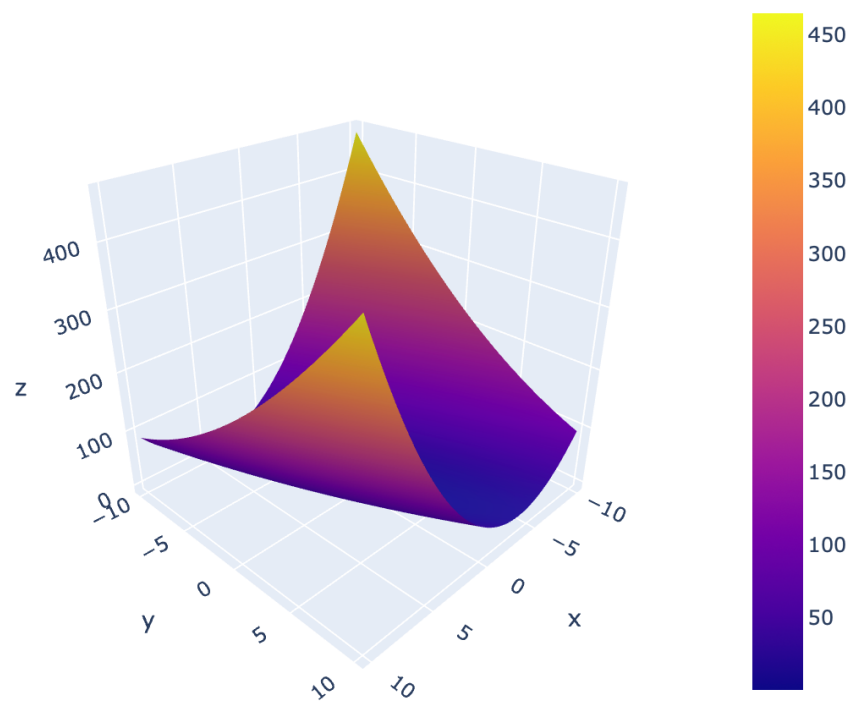
Loss function for different thetas



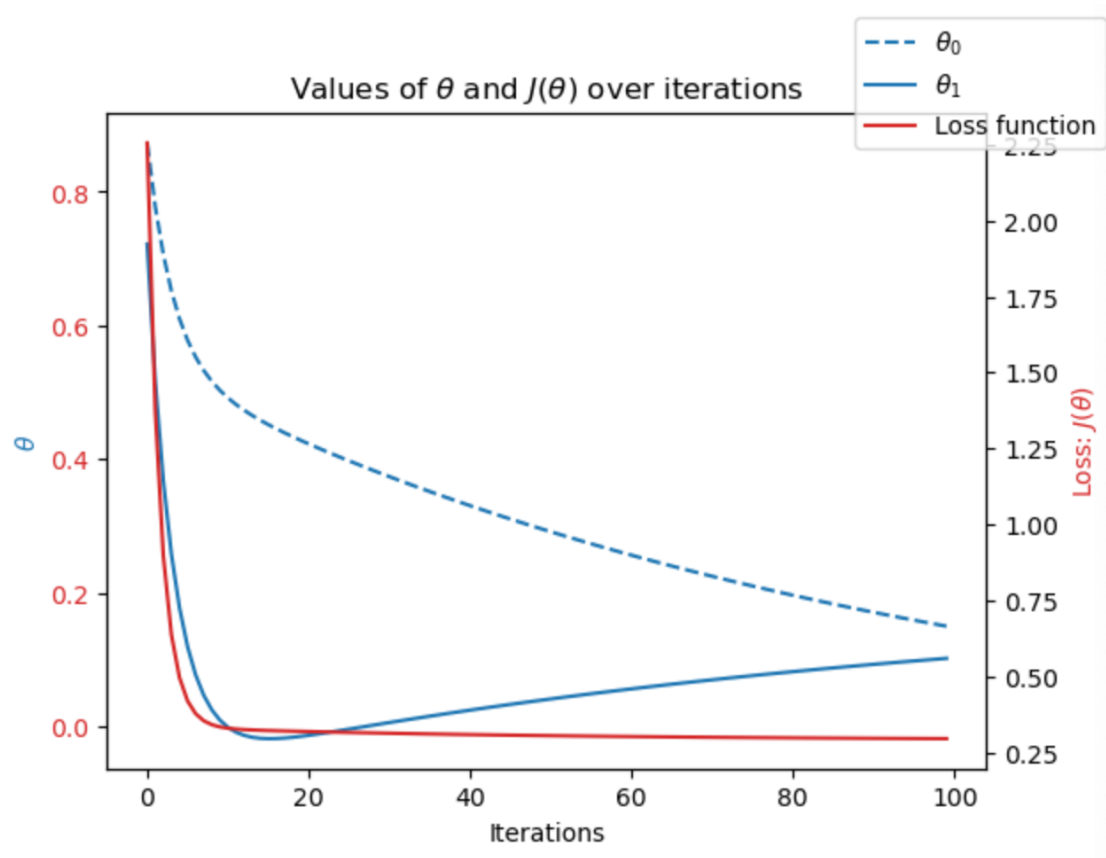
2020 Budapest



Loss function for different thetas



2020 Stockholm



Loss function for different thetas

