

**1.3: OPTIMIZATION IN RELATION TO PROBLEM-SOLVING**

<b>Weather Station</b>	<b>Year</b>	<b>Theta0</b>	<b>Theta1</b>	<b>Iterations</b>	<b>Step size</b>
Budapest	1960	-5	-1	100	0.01
Budapest	1990	-5	-1	100	0.01
Budapest	2020	-5	-1	100	0.1
Madrid	1960	0	0	500	0.02
Madrid	1990	0	0	500	0.02
Madrid	2020	0	0	200	0.05
Stockholm	1960	0	0	15	0.01
Stockholm	1990	0	0	100	0.01
Stockholm	2020	0	0	150	0.1

**Summary of Observations on Weather Station Temperatures Over 60 Years:**

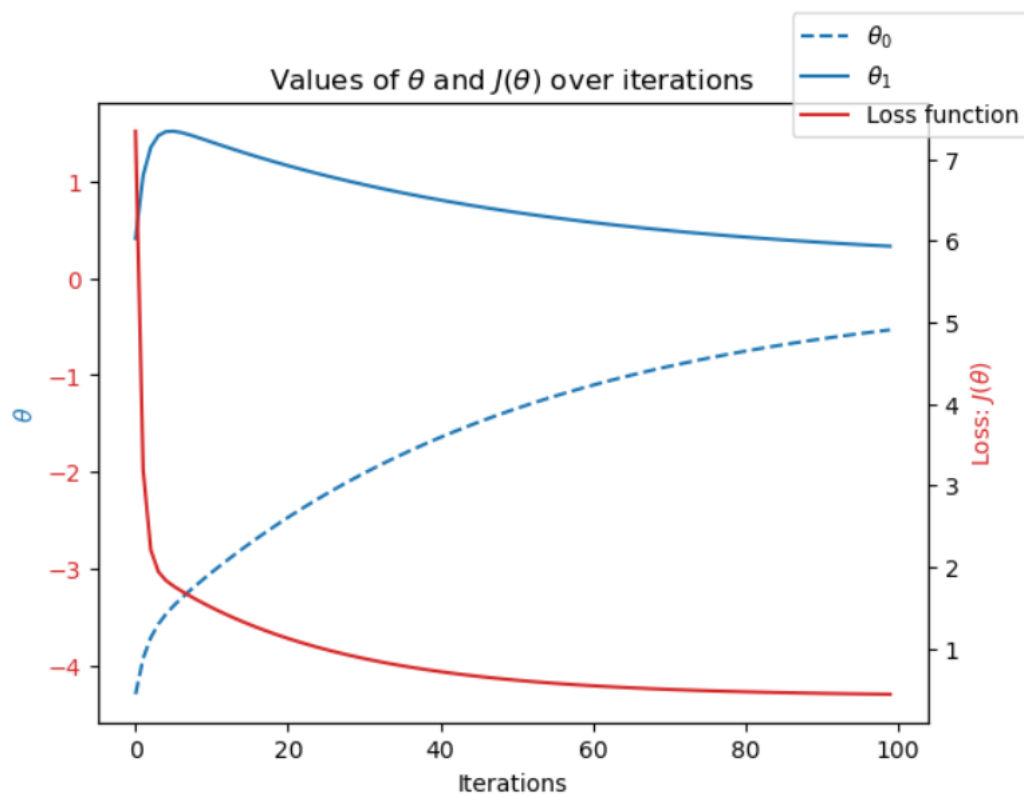
Over the span of 60 years (1960, 1990, and 2020), temperatures across three weather stations—Budapest, Madrid, and Stockholm—show a clear trend of warming, with each location exhibiting unique patterns based on its geographical and climatic factors.

1. **Overall Temperature Increase:** All three stations experienced a general rise in mean temperatures, which aligns with global climate change trends. This increase, although consistent, varies in magnitude depending on the region and local factors.
2. **Budapest's Significant Warming:** Budapest showed the most pronounced temperature rise, particularly from 1990 to 2020. This period of rapid warming may reflect urbanization effects and changing regional climates. The 1960 to 1990 period was more stable, with notable warming only beginning in the last few decades.
3. **Madrid's Milder Warming:** Madrid experienced the smallest increase in temperatures among the stations. The relatively consistent warming across the decades might be due to its already high baseline temperatures in a Mediterranean climate, where additional temperature rises are less noticeable.

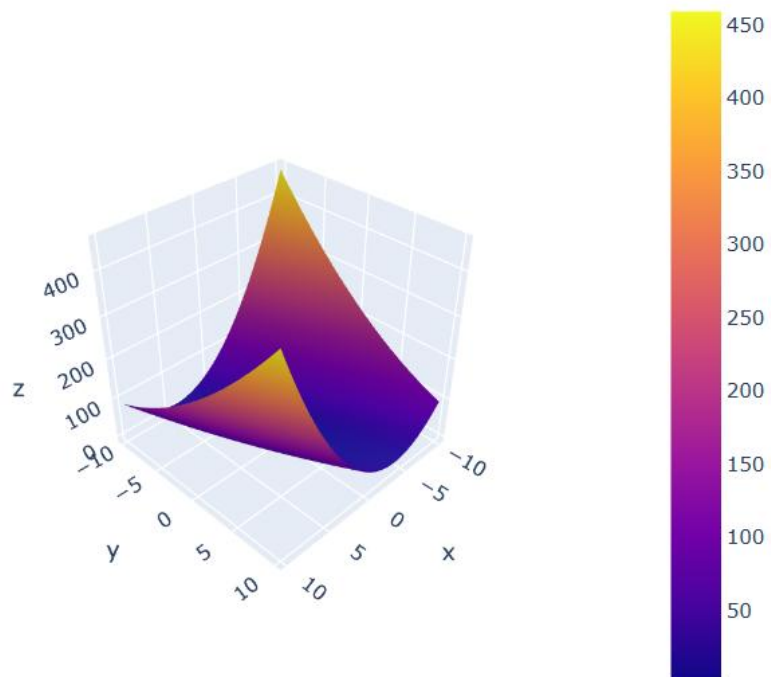
**Conclusion:**

The findings underscore the variability in climate change impacts across Europe, influenced by factors like regional climate, urbanization, and baseline temperatures. Budapest saw the most significant changes, Madrid experienced the least, and Stockholm showed moderate warming, providing a comprehensive view of how different regions are adapting to climate change.

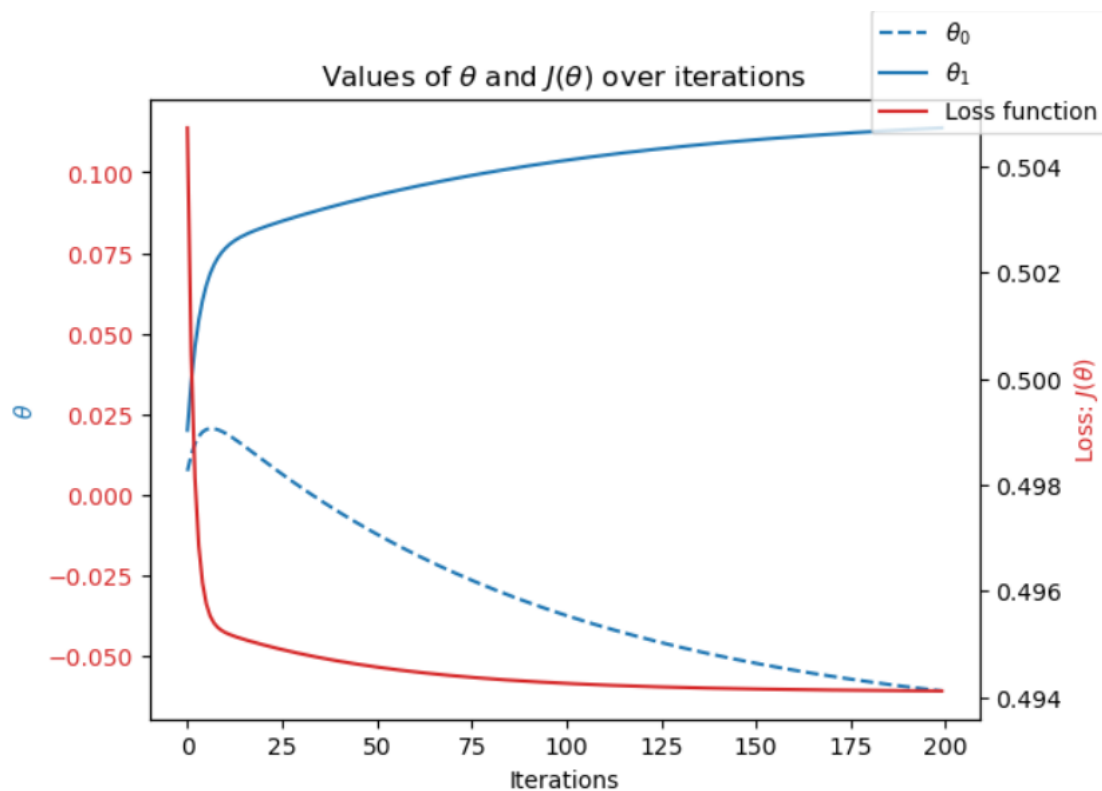
# BUDAPEST WEATHER ANALYSIS FOR THE YEAR 2020



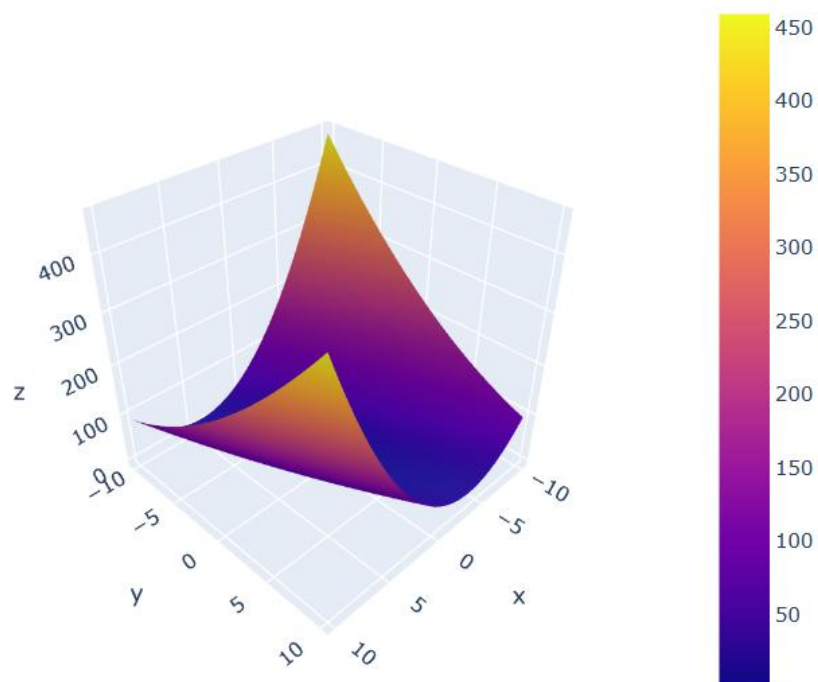
Loss function for different thetas



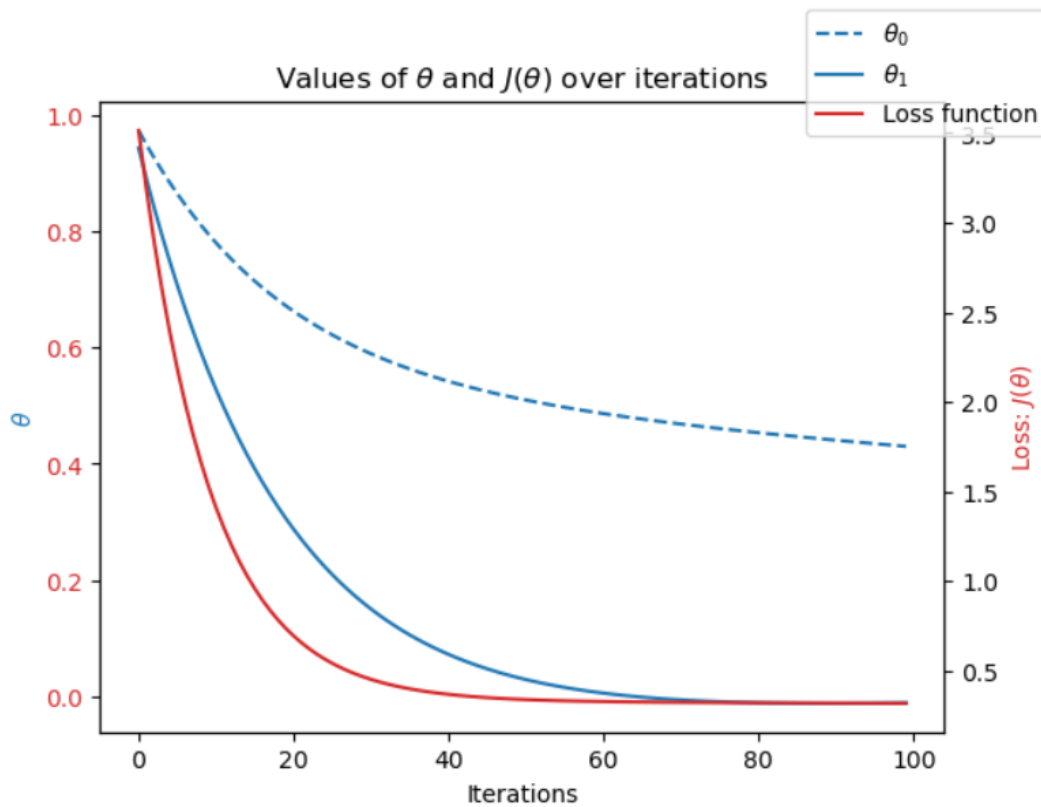
# MADRID WEATHER ANALYSIS FOR THE YEAR 2020



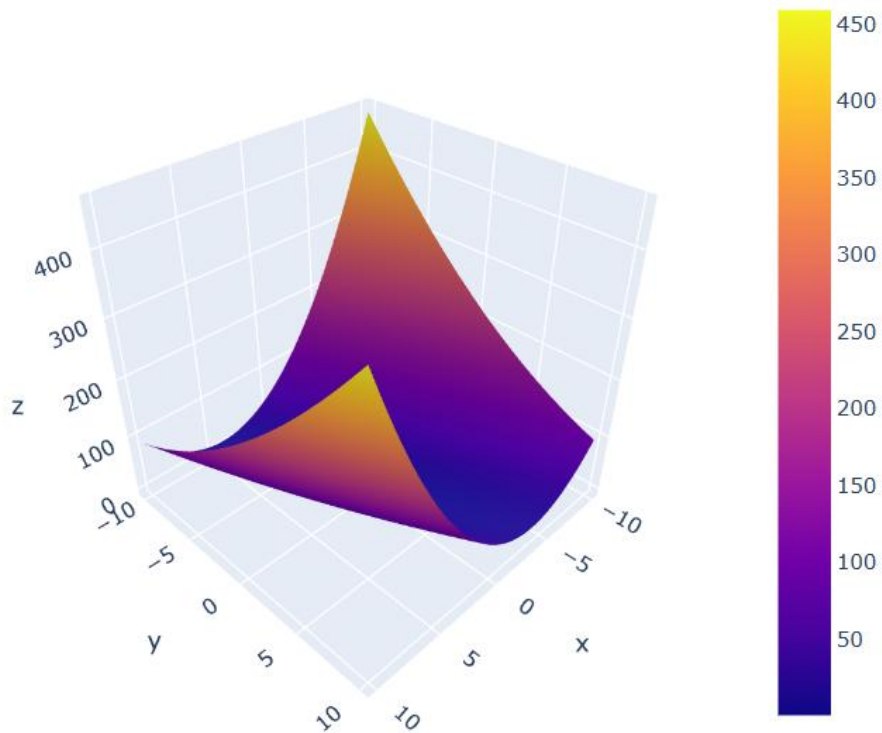
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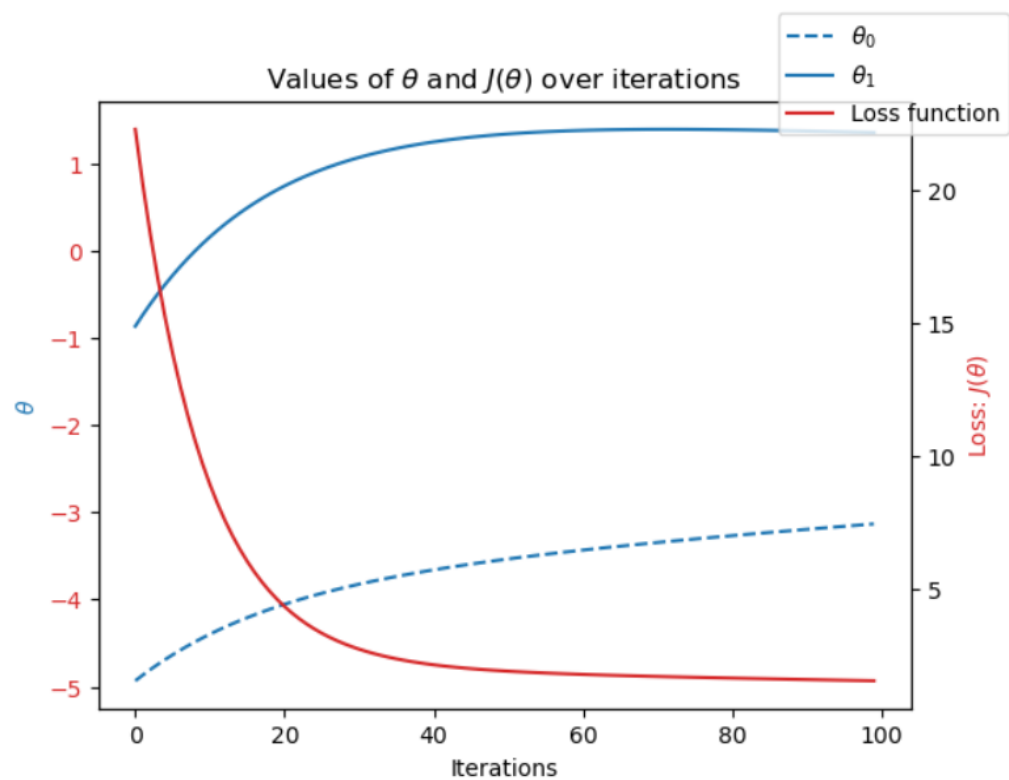
# STOCKHOLM WEATHER ANALYSIS FOR THE YEAR 2020



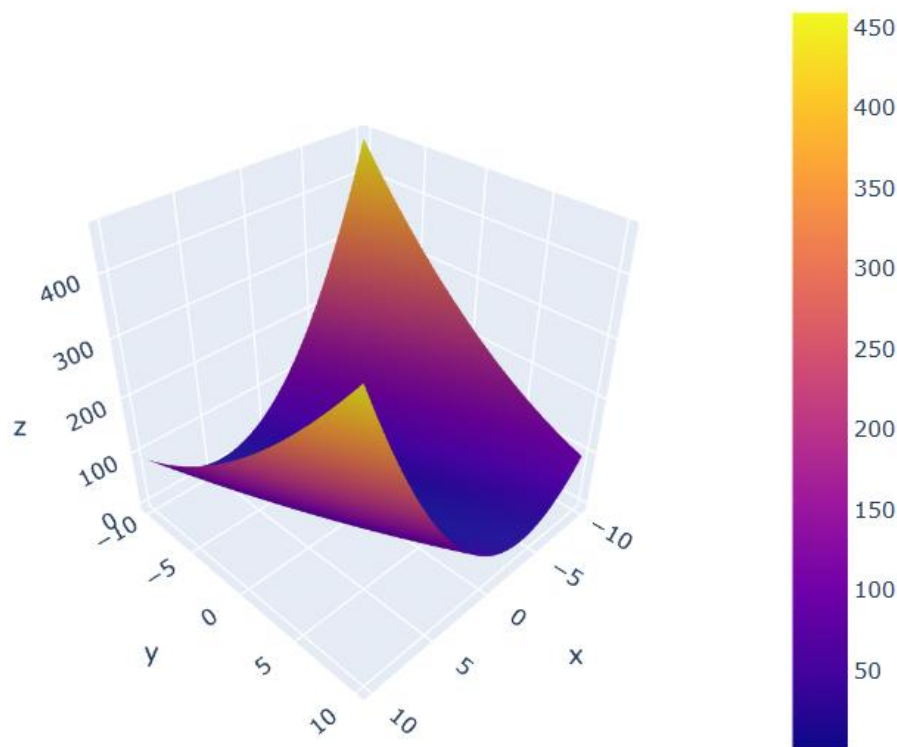
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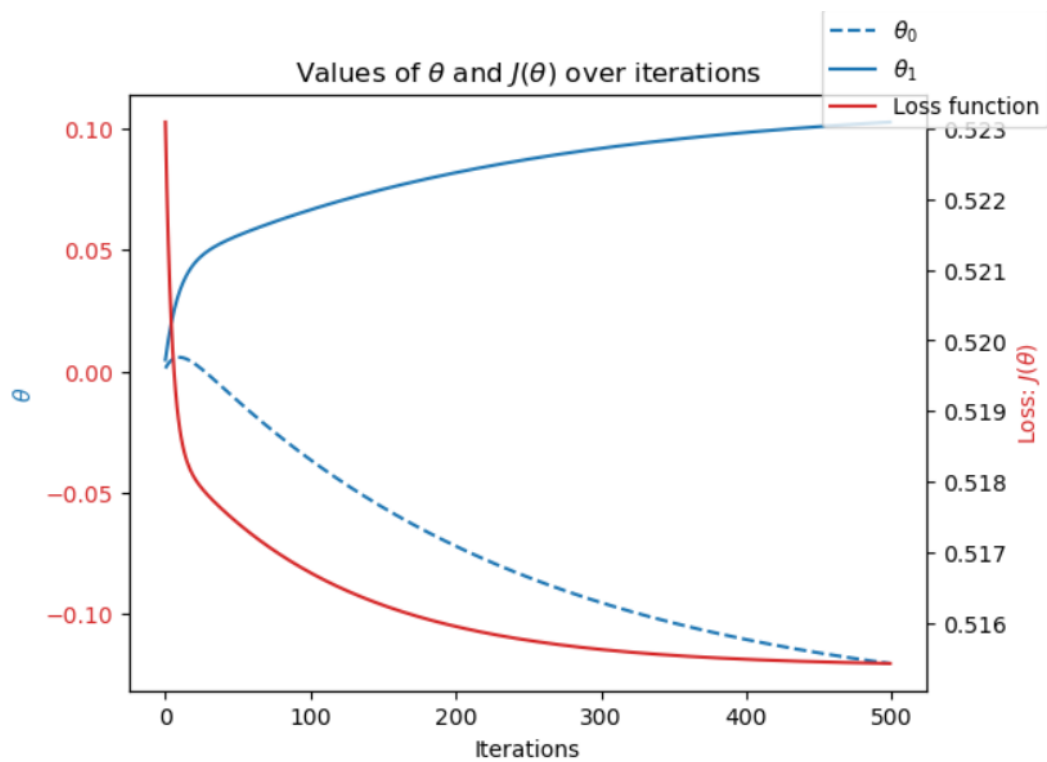
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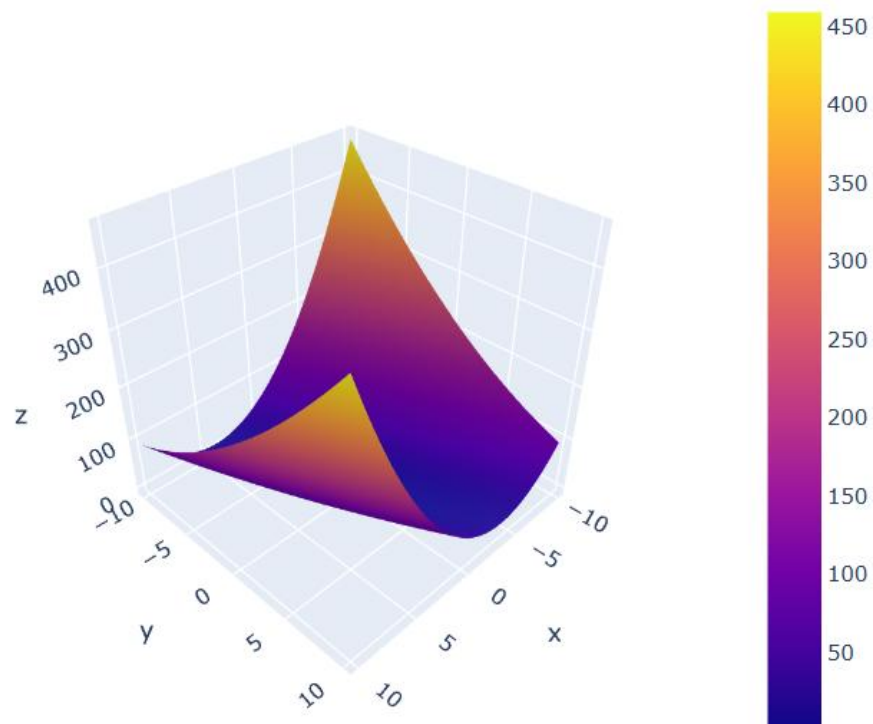
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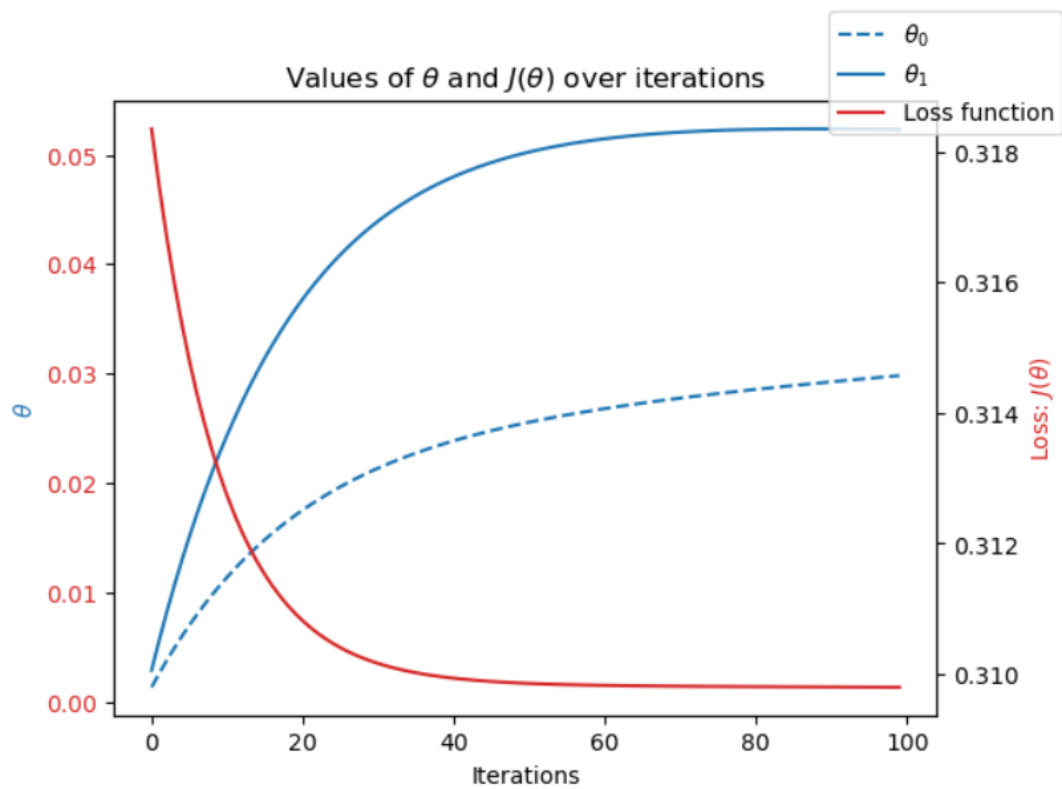
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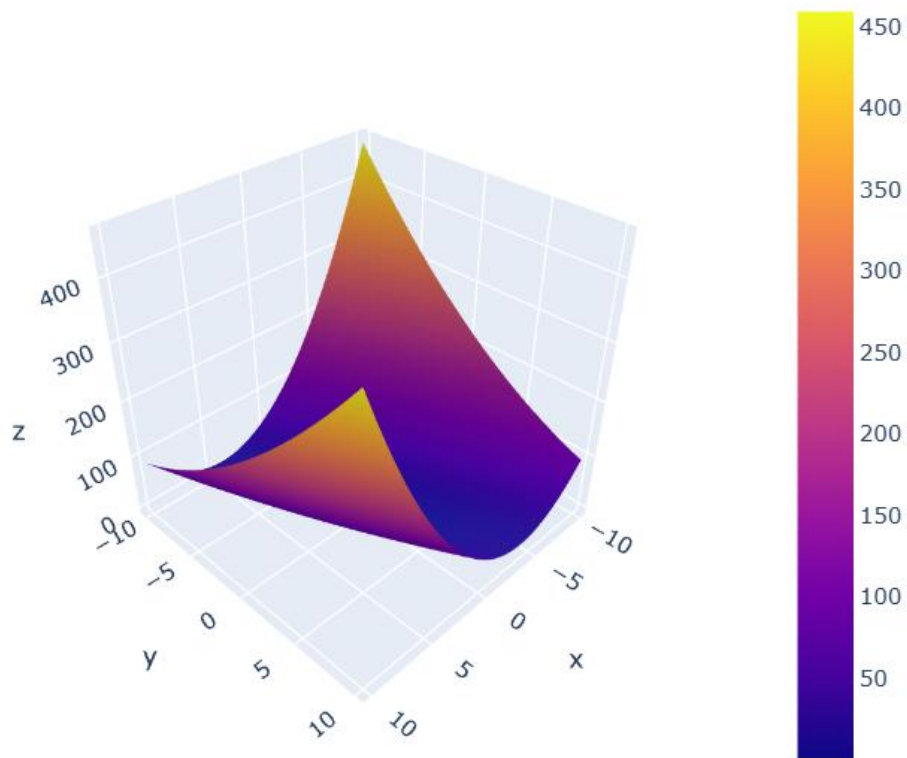
Loss function for different thetas



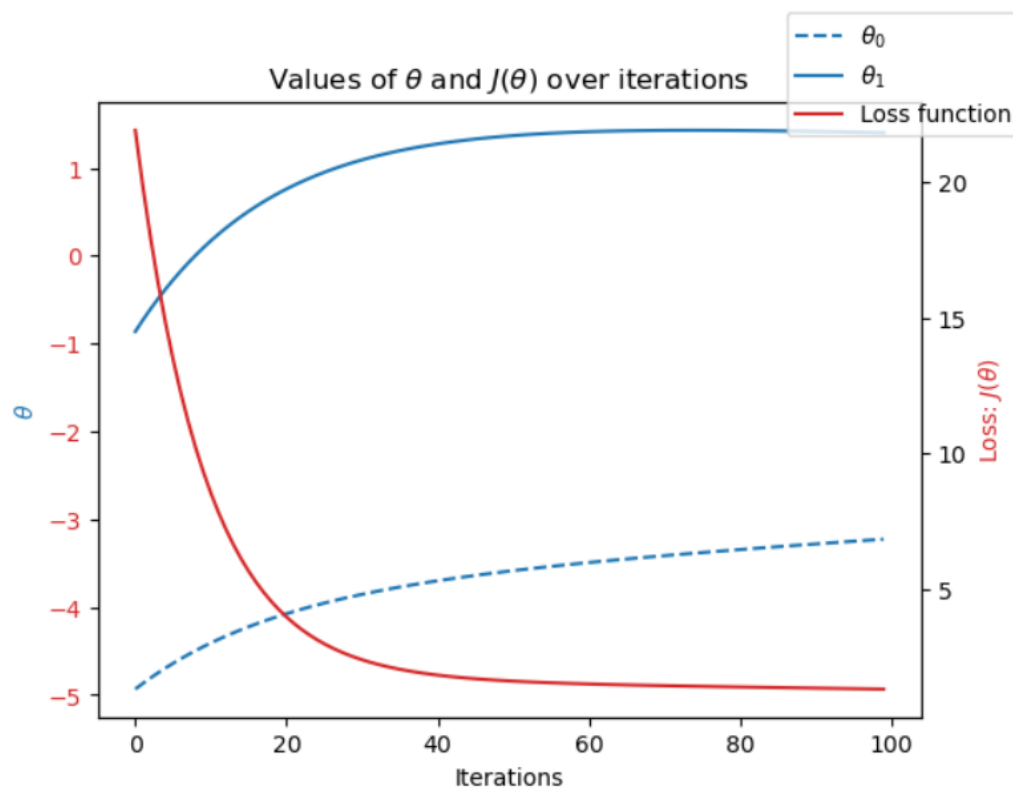
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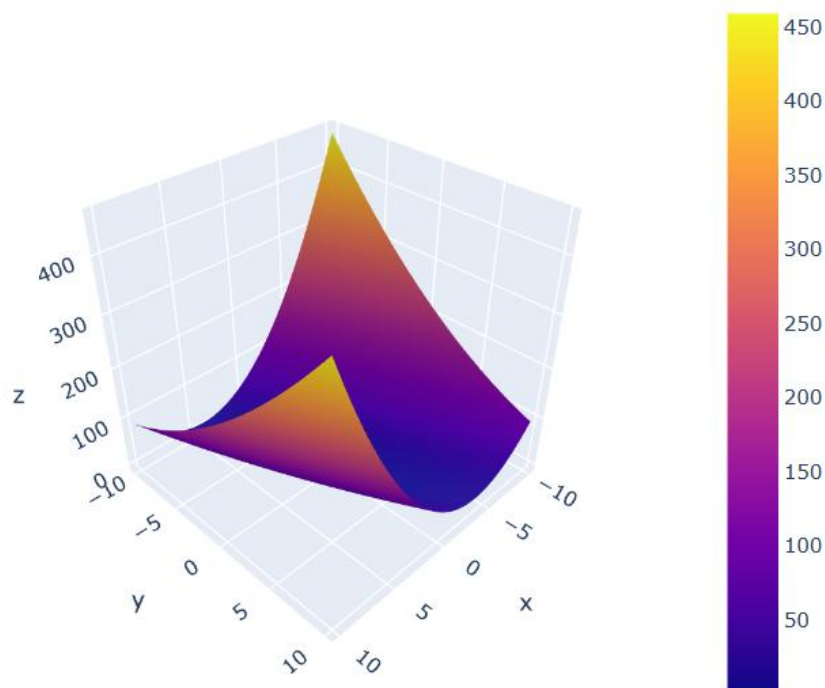
Loss function for different thetas



## BUDAPEST WEATHER ANALYSIS FOR THE YEAR 1960

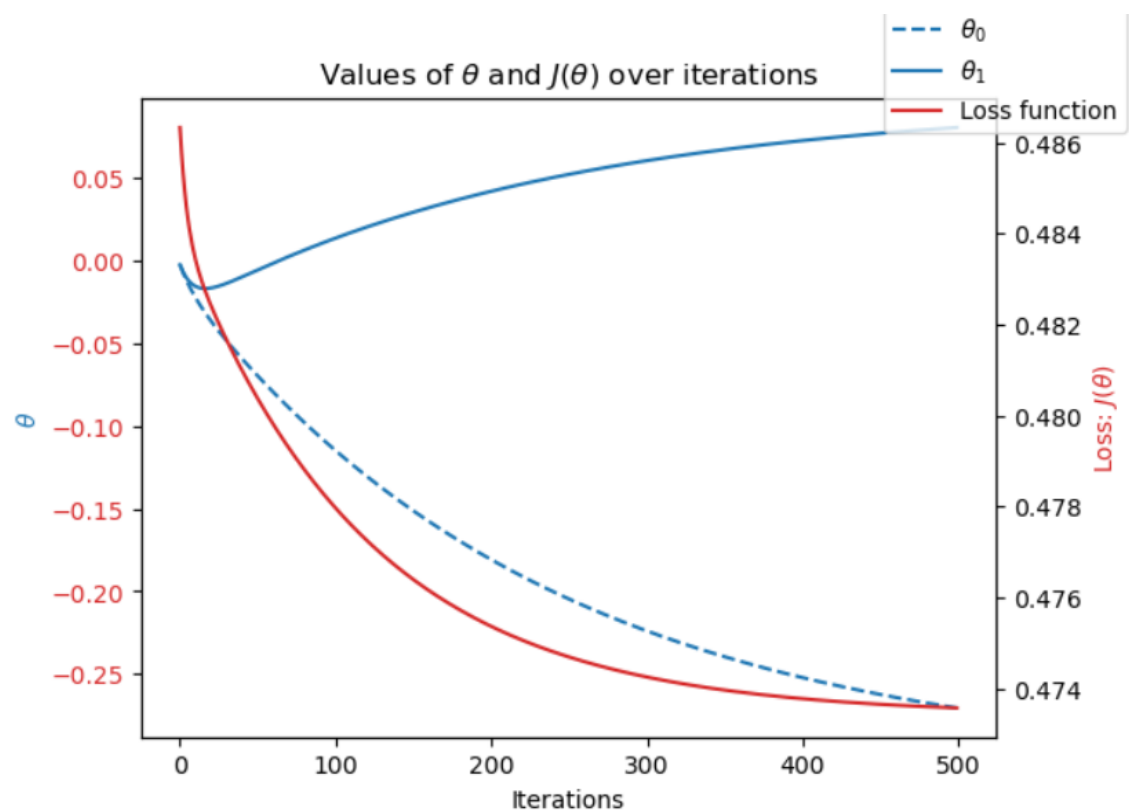


Loss function for different thetas

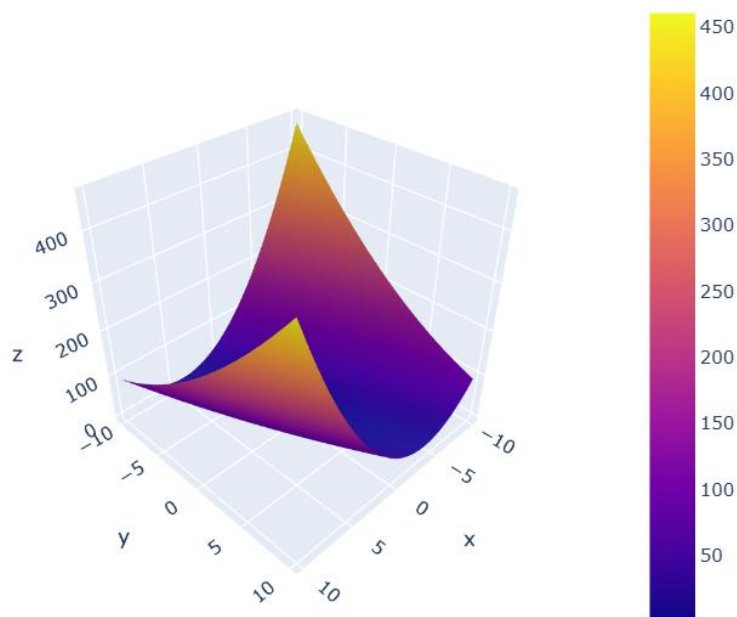




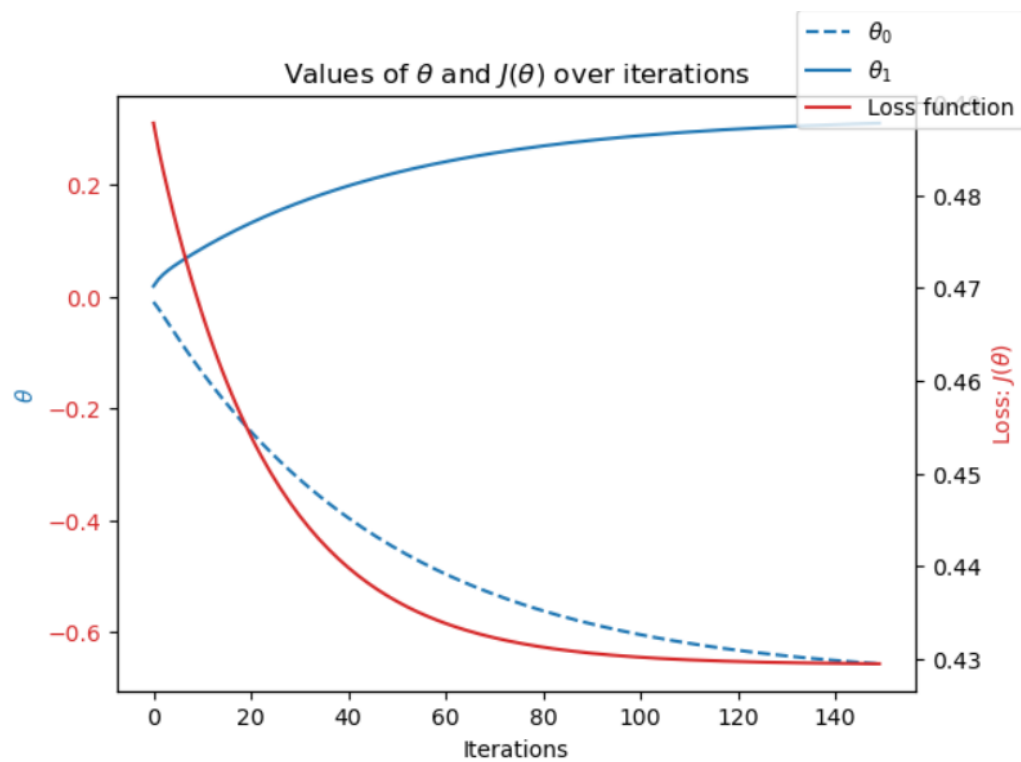
# MADRID WEATHER ANALYSIS FOR THE YEAR 1960



Loss function for different thetas



# STOCKHOLM WEATHER ANALYSIS FOR THE YEAR 1960



Loss function for different thetas

