Design 1: Population Data

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Part 1 Analysis

What trends do you see in the data?
The trend that can be seen is an exponential growth.

Analyze how big the differences between various estimates are. Do you see a trend, i.e., do the differences become smaller or larger over time?
The differences of various estimates become relatively small compared to the present.

Think about these differences relative to the estimates at the respective time points and in absolute terms. When are the uncertainties the largest in absolute, when in relative terms?
The differences relative to the estimates in the beginning are the largest, they are getting smaller over time because the estimates are getting more accurate. The differences relative to the estimates in absolute terms are getting bigger over time because the world population is getting bigger.

Do you think you can faithfully represent the uncertainty and the data in the same plot? Why, or why not?
No this is not possible. The time intervals change, so in order to represent the data in the best possible manner we have to use multiple plots. It is not possible to have a plot with a Y axis (world population) that has to represent over 7 billion people (2015) as well as 2 million (10000 BC) people accurately.

What effect do you think will the linear interpolation have on the uncertainty?
When using linear interpolation over a longer timeframe, it would yield more uncertainty, since there is no information about the time in between. By using smaller time steps, it would corresponds to a better estimate with less uncertainty due to curves having almost linear steps in those smaller timesteps.

Is linear interpolation a suitable method for this data?
It is not, since the timesteps within the data vary from 1 till 1000 years in between data points. This would yield uncertainty in between those years, which would suggest that

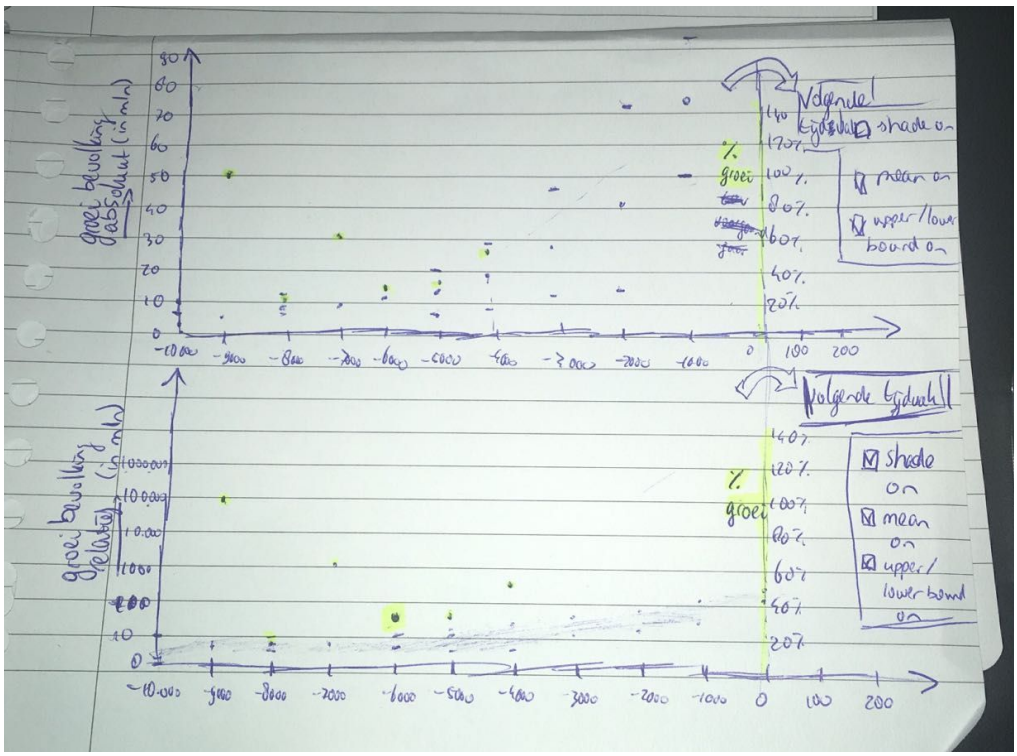
linear interpolation would give larger uncertainty. So, this means it is not suitable, because you don't want to introduce (more) uncertainty.

Part 2 Sketching

Four alternative visual representations:

Since we used two different y-axes within one graph, we choose to show the two outcomes of this. Instead of making four, we made it more compact by the double y-axes.

- Two different y-axes over time. One y-axis shows the absolute growth while the other shows the relative difference between the data at a certain time.
    - This is shown as a logarithmic scale.
    - This is shown as a "normal", absolute scale.



Part 3 Group Reflection

By making the different visual representations, we saw that merging the absolute and relative differences over the years into one graph by two y-axis showed the best result. All the necessary information can be found within one graph and with a correct diagram

legend, all the information is clear as well. Since the quantities in the graph are quite large, a logarithmic scale helps to keep the information visible within boundaries. This is why we all agreed on this being the best representation.