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# 4.4.5 Problem Set: Monte Carlo simulation of climate model

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1. In the `sample_climate_results` function, implement a Monte Carlo simulation of the climate model, with the sample size given by `Nsample` and the random inputs described in Section 4.4.2. Calculate the max temperature rise in each run of the simulation, and plot the histogram of those results. Uncomment the last two try-except blocks in the main block of `climate.py`, and run the file to see the histograms.

While your specific values will vary, your histograms should look roughly similar to Figures 4.20 and 4.21. Include axis labels and a plot title identical to that shown in these figures. (Use `ΔTmax` in the x-axis label to get the Δ character.) Use the `density=True` option for the histogram plot.

2. In the `calc_percentiles` function, determine the 5th-, 50th- and 95th-percentiles of the maximum temperature rise distribution in your sample. Use NumPy's percentile function

to calculate and return them. (Look up its documentation in `np.percentile`.) Also print these values out with same formatting and precision shown below. These are values for the growth scenario:

dTmax	5%:	5.97 K
dTmax	50%:	7.41 K
dTmax	95%:	8.61 K

And for the decline scenario:

dTmax	5%:	0.44 K
dTmax	50%:	1.16 K
dTmax	95%:	1.82 K

Your values will vary, but should be in similar ranges.

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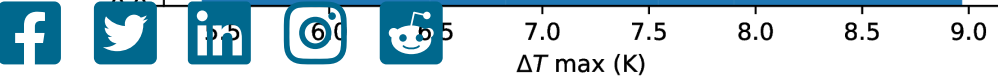


Figure 4.20: Distribution of maximum temperature for a Monte Carlo simulation of 100 for **growth** scenario.

