

Homework 2

Aerosol Physics, Chemistry, Clouds and Climate

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Problem 1 Condensation

1.a

1.b

Since the z-score is greater than the critical value, the null hypothesis is rejected.

1.c

Problem 2 Coagulation

2.a Hypothesis testing

2.b Sensitivity Analysis

Assuming γ values are from 0 to 1. For each of gamma, 10000 monte carlo simulations were run. Then the fraction of time each approach gives the correct answer was calculated. The results are shown in the figure ??.

The results show that for all values of γ , the Bayesian approach is better than the hypothesis testing approach for this problem. This is because the Bayesian approach is using the prior information about the wind direction. Also, the Bayesian approach is least effective when $\gamma = 0.5$ while the frequentist approach is least effective when $\gamma = 0$. The model in the frequentist approach does not have any knowledge about the wind that is coming from the east, and its probability of happening so the model is only effective in γ values close to 1 where the most probable wind is from the west.

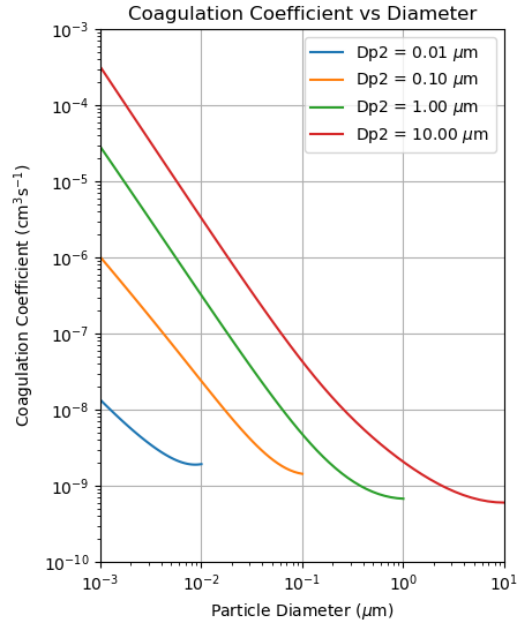


Figure 1: Fuchs Coagulation the code

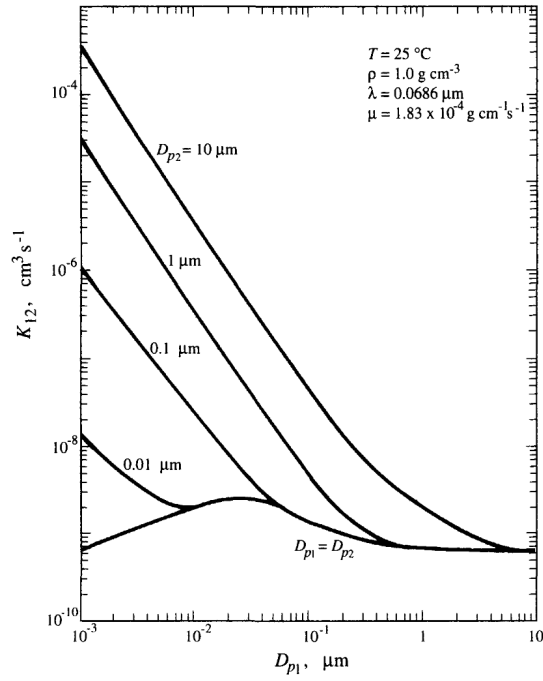


Figure 2: Table_13.5 Fuchs Coagulation plot