
Be sure to hand in your `.m` files.

- a) The lapse rate is an important quantity in meteorology. It describes how the temperature decreases as you go up in the atmosphere. The lapse rate is defined as

$$L = -\frac{dT}{dz}$$

where T is the temperature in Celcius and z is the height above the ground in meters.

The file `skewt.dat` contains 4 columns of data from a sounding from Pittsburgh on November 8. The first column is the pressure in hectoPascals, the second column is the height above the ground in meters and the third and fourth columns are the temperature and dew point in Celcius.

Load the data file into MATLAB and create a spline for temperature as a function of height. Use this spline to compute the lapse rate. Plot the lapse rate as a function of height (plot lapse rate on the x -axis and the height on the y -axis).

- b) Solve the differential equation

$$y'(t) = t^2 \sin(P(t)), y(0) = 5, t \in [0, 3]$$

where $P(t)$ is the function contained in the file `hw25_2.dat`. Plot the solution.