Problem Wk.6.1.1: Proportional Delay

Part 1: delayPlusPropModel

We wish to analyze the behavior of the delay-plus-proportional controller described by

```
   omega[n] = k1 * e[n] + k2 * e[n-1].
```

Use the functions and methods associated with the `sf` module to construct a procedure called `delayPlusPropModel` that takes two required arguments:

- the proportional gain `k1` applied to the error at time `n`, and
- the delay gain `k2` applied to the error at time `n-1`

and which returns a system function for a system whose input is the desired distance and whose output is the actual distance.

You can debug these in Idle by using the file `designLab06Work.py`.

Part 2: Gains

Consider four different values of k1: 10, 30, 100, and 300. For each value of k1, use `optimize.optOverLine` (from the `optimize` module) to determine the value of k2 that minimizes the magnitude of the least stable pole.

Enter 1 decimal place of accuracy for k2 and 2 decimal places for the pole magnitude.

1.

k1	k2	magnitude of dominant pole
10		
30		
100		
300		