# Python H.w.5

(Due day：12/31 00:00)

A tuned mass damper (TMD) is a device mounted in structures to reduce the amplitude of mechanical vibrations which are often used in skyscrapers, such as Taipei 101. To reduce the vibrations, the oscillation frequencies of the TMDs are tuned to the resonant frequency of the objects they are mounted to.

It is known the natural period of Taipei 101 is 6.8 seconds and the mass of the damper is about 660 metric tons. Here, we assume the damper reaches the maximum amplitude of 20 cm because of a typhoon. We define the variation ratio of the acceleration as a factor *j*, that is $j = \frac{da}{dt}$.

1. How much damping coefficient is needed to keep the factor below 0.05 $m/s^3$ so that the people in the building won't feel obvious variations. Please draw diagrams to explain. (Hint: use "for" or "while" loop to find out the maxima value of the factor under different damping coefficients.)
2. Plot the x-v diagram and explain the behavior of the plot. (Hint: you will see the vortex picture)