星期一（4/22）各隊報告事項：

Please carefully read and do the following items.

1. Add a damping term to your mass-spring system such that $\ddot{w} + 2\zeta\omega_n\dot{w} + \omega_n^2 w = u/m$ where the natural frequency is $\omega_n^2 = k/m$ and the damping ratio is assumed to be $\zeta = 0.005$.
2. Given a sample interval Δt , generate its discrete-time model for the mass-spring-dashpot system $\ddot{w} + 2\zeta\omega_n\dot{w} + \omega_n^2 w = u/m$.
3. Follow carefully the 8 steps shown in the homework (4/15) to identify the system matrices *A, B, C, D*. Note that the system state matrix may be any size larger than 2 by 2, depending on the number of non-zero singular values which are used to compute the state matrix.
4. Solve eigenvalues and eigenvectors of the identified discrete-time state matrix and convert the discrete-time eigenvalues to continuous-time eigenvalues (see Page 34 in the note: era.pdf).
5. Compute the natural frequency and damping ratio for each continuous-time eigenvalue (see Pages 35 and 36 in the note: era.pdf).
6. Compare all identified damping ratios and natural frequencies with the true damping ratio and natural frequency. Note that the number of identified damping ratios and natural frequencies may be larger than 1.
7. Repeat Step 1 to 6 with the assumption that $\zeta = 0$.