ASSIGNMENT – CONTACT MODEL

1.	Given is the linear spring dashpot contact model. Derive analystically the contact duration for a normal two-particle collision. How does it depend on stiffness and mass? What changes if you collide a particle with a non-moving wall of infinite mass? Given stiffness k=10^8 N/m and viscosity v=100 kg/s, what is the contact duration and the restitution coefficient for particles (spheres) made from aluminum, of different sizes (d=0.01, 0.1, 1.0, 10, 100 mm)?	8
2.	Get your hands on an MD/DEM program ☺ What are the time-scales in your system? Choose some settings for the linear and/or the Hertzian contact model a Compute/estimate t_c - under average and under worst-case conditions. b Verify that t_c/50 is a good time-step (by trying shorter and larger ones) c Specify the other relevant time-scales in your system (like e.g. 1/shear-rate, dissipation-time scale, time between collisions, etc.)	8
3.	2. What is the sound-propagation speed in your system? 2.a Estimate analytically 2.b Compute with MD/DEM numerically 2.c Compute with your MD/DEM code, the numerical macroscopic elastic constants in a 2D pre-stressed regular lattice. 2.d or do it analytically (you dont need MD for it)	4