## Flight Simulation (List 6)

Due: 07.12.2016

1. Consider the B737 once again. It has three wheels, a front wheel at position $(12,0)$, and two main wheels at positions $(-2,3)$, and $(-2,-3)$.
Assuming the plane is loaded at its maximum landing weight of 51710 kg , what is the force on each of the wheels? (The total force must be equal to the weight, and the sum of the resulting torques must be zero.)
2. Let us for convenience assume that the wings contain one third of the mass ( 51710 kg ), and that the rest of the mass is in the fuselage. To make things even simpler, we assume that mass in the fuselage is equally distributed between $X=-14$, and $X=+14$ in the fuselage. What is the moment of inertia of the B737, using the formula in the slides?
3. Assume that the plane has a speed of $(100,-10) \mathrm{m} \cdot \mathrm{s}^{-1}$, and a pitch angle of $5^{\circ}$. Assume that the plane is pitching up at $5^{\circ}$ per second (This is an angular velocity). Further assume that the main wings are attached to the fuselage at $3^{\circ}$. What is the angle of attack for the main wings?
4. What is the speed (as vector) of the elevators? Assume that the elevators are trimmed at $-1^{\circ}$. What is the angle of attack of the elevators?
Assuming that their profile is NACA 0009, what is the lift coefficient for the elevators, what force do they create, and what torque?
