# Homework 2

## total 16 pts

**Due** Wednesday, January 28, 12:50 pm in class.
**Reading**: Chapter 2 from the textbook.
**Note:** Make your solutions neat, concise, and intelligible. It is not sufficient just to state the answer. Points may be deducted, if it is difficult to find and/or understand the solutions. You are not required to solve the bonus problem. Not submitting it will not reduce your homework total score.

**Problem 1 [2pts].** Linear drag force due to Stokes's law. Problem 2.2⋆ from the textbook.

**Problem 2 [5pts].** Origin of the quadratic drag force. Problem 2.4⋆⋆ from the textbook.

**Problem 3 [2pts].** Reynolds number. Problem 2.3⋆ from the textbook.

**Problem 4 [3pts].** Vertical linear drag. Problem 2.5⋆ from the textbook.

**Problem 5 [4pts].** A steel ball bearing swimming in glycerin. Problem 2.10⋆⋆ from the textbook.

**Bonus problem[5pts].**  Sinking of the Titanic. Assuming that Titanic's hall is a sphere with the diameter of 70 m and filled with water, estimate its velocity when Titanic hits the bottom of the ocean 4km down the surface. Use.
$\beta = 0.001 \frac{kg}{m\,s}, \gamma = 1000\ kg/m^3$ , the hall mass is 50,000 tons