**Homework – 2**

Problem 1: During an engine test on the ground, a propeller thrust $T = 3000$ N is generated on the 1800-kg airplane with mass center at G. The main wheels at B are locked and do not skid; the small tail wheel at A has no brake.

(a) Compute the percent change n in the normal forces at A and B as compared with their "engine-off" values.
(b) For what value of T will the magnitude of the moment of T about the point B exceed the moment of the weight of the aircraft about the same point?
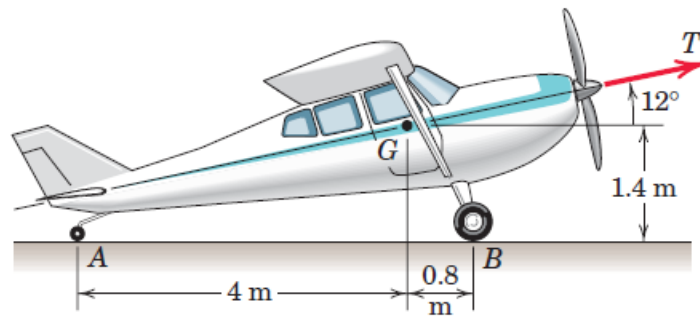
Problem 2: Consider the rudder assembly of a radio-controlled model airplane. For the 15° position shown in the figure, the net pressure acting on the left side of the rectangular rudder area is $p = 4 \cdot 10^{-5}$ N/mm^2. Assume the aerodynamic pressure to be uniform.

(a) Determine the required force P in the control rod DE and the horizontal components of the reactions at hinges A and B which are parallel to the rudder surface.
(b) Assume that all dimensions are multiplied by a factor 2 (angular orientation of the rudder remains 15° and also the pressure does not change). What will be the new values of the force P and reactions at hinges A and B?