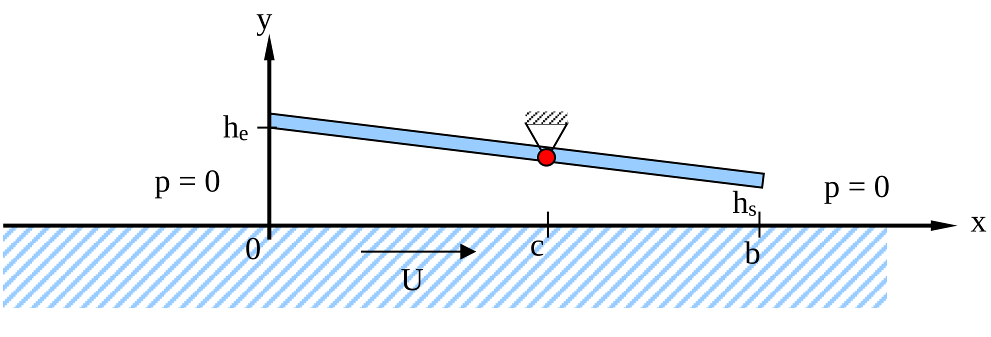
Pivoted-pad slider bearing

The simplest form of a pivoted-pad bearing provides only for straight-line motion and consists of a flat surface sliding below a pivoted pad as shown in the figure. If the pad is assumed to be in equilibrium under a given set of operating conditions, any change in these conditions, such as a change in load, speed, or viscosity, will alter the pressure distribution and thus momentarily shift the center of pressure, creating a moment that causes the pad to change its inclination. A pivoted-pad slider bearing is thus supported at a single point so that the angle of inclination becomes a variable and has much better stability than a fixed-incline slider under varying conditions of operation. The location of the shoe's pivot point can be found from the equilibrium of moments acting on the shoe about the point. For all practical purposes, only two significant forces may be considered in the moment equation : the resultant due to film pressure and the reaction force normal to the shoe surface. The force due to friction is ignored. Pivoted pads are sometimes used in multiples as pivoted-pad thrust bearings or in journal bearings. Normally, a pivoted pad will only carry load if the pivot is placed somewhere between the center of the pad and the outlet edge ($b/2 < c < b$). For bidirectional operation the pivot is located at the center of the pad at $c = b/2$.

Hypotheses :

- continuous flow
- Newtonian fluid → Reynolds equation
- Thin film

ρ = cte , η = cte , permanent regime, infinite length



h_e : input film thickness
h_s : output film thickness

Give:

1. The simplified form of the Reynolds equation and subsequent pressure distribution
2. The load-carrying capacity per unit length and the optimum value of a.
3. The fluid flux
4. The friction force

Results will be expressed as a function of parameter a defined as : $a = \dfrac{h_e}{h_s}$