Solution proposal Classroom exercise 1

 **Calculation of two-phase flow, without explicit slip**

**a) Superficial velocities**

Gas / oil ratio with injection



 vsl=2.71 m/s vsg=0.870 m/s

 vm=vsg+vsl=3.58m/s

**b) Flux fraction**

 

1. **Flow regime**

Flux fraction estimated above: L=0.756, ie 76% liquid in the stream. (The volume fraction will be slightly larger). Thus, liquid-dominated, continuous liquid with a fairly large, 24% gas content. The average speed is relatively large (vm = 3.59m / s), ie considerable turbulence so that the bubble size will probably be relatively small.

1. **Downhole pressure gradient**

Densities

 g=217 kg/m3 L=663 kg/m3

 m=555 kg/m3

Reynolds number: 

Friction faktor : 

Slip also involves friction between gas and liquid, so we assume: *f=0.03*



1. **Outlet pressure**

