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3. FLUID MOTION

3.1 Fluid motion characteristics

* Turbulent Vs. laminar flow

Laminar: flow in layers

Turbulent: ~ ~ irregular paths

To distinguish, Reynold number is used as

$$Re = VD/\nu$$

V = flow velocity

D = pipe diameter

or = 4R

R = hydraulic radius

= flow area / wetted perimeter

= A/P

ν = dynamic viscosity

= μ/ρ

R > 4000 Turbulent

R < 2000 Laminar

R: 2000 – 4000 : transitional

2)

* Closed conduit Vs. open channel flow

Closed conduit: flow is under pressure

open channel: " " at. pressure

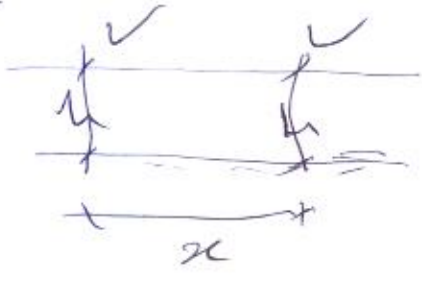
Pipe Vs Rivers

* Uniform Vs non Uniform flow

- Uniform: flow features (height, Vol.) do not change with space at given time.

- Nonuniform: otherwise

$\frac{d(h,V)}{dx} = 0$ uniform



Rivers can be either

3) * Steady Vs Unsteady flow

- steady : flow features do not change with time at a given point.

- Unsteady : otherwise

t_1 t_2

$\frac{d(h,v)}{dt} = 0$ steady

Rivers can be either

So, any flow can be described by these 4 characteristics