

## Fluid Hechanics

For a fluid, the fundamental laws that we will take into

- law of Conservation of Masc
- 2 Law of conservation of momentum
- Newton's 2nd law of Motion
- law of Concervation of Energy
- laws of thermodynamics.
- Angular momentum

## Control Volume

Control Volume as the name suggests, is a shaped volume (like cuboid, use etc) through whose faces mase can come in and Leave in any arbitrary way possible 19

Now the face through which mass can leave or enter depends on the pressure field in the domain

Each of these faces are called control surfaces which can be considered as infinitely thin surface through which mass can come in, but its mass is so small that it can't hold any fluid.

A control volume has a fixed mass, but a porous boundary

System

A system is control volume whose surfaces arent porous to the flow of mass. A system also defines fixed mass of the fluid In a system, the mass is always constant.



Whereas in a control volume, mass can come in mass can go out or mass can even get accumilated (eg. when the density of the fluid is changing, so the macs of fluid contained may change)

Differential approach and Integral approach

Differential approach starts with infinitesmy small system and goest into a finite system

Integral approach starts with finite system and gives us the gross behaviour of the finite system as a whole.

Based on the application, sometime we use diff approach and some time integral approach.

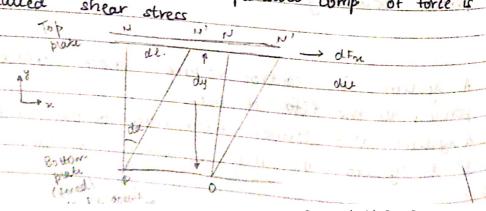
> Viscosity of social is so, ciquid is small and gases is negligable.

## Stress

when there a is a force on an area, it can resolved into two components,

The stress due to normal comp. of force. is called normal stress

The stress due to parallel comp of force is called shear stress



Scanned with CamScanner



	-3					
beformation rate is the rate of change of angle (x)						
in of change of angle (a)						
shear stress (2) =	-					
men I dan						
Area direction day written to denote setted upon that area and force	Production					
acted upon that area and force are perpendicular	-					
Normal stress (ogy) = dty Hai H' N. W'						
dAy						
dx/ dy - d	-					
di = du dt, di = dy da // 1	-					
, as any act						
da = du	-					
$\frac{d\alpha}{dt} = \frac{du}{dy}$						
The state of	-					
Deformation rate of change rate of x-comp of	-					
Velouity						
•						
Newton's law of Viscosity						
The correction of the correcti						
Tyn a du > Tyn = - y du						
Viscosity						
A STATE OF THE STA	-					
Type pironan Fluid Viscosity is a	_					
singuit sich Newtonian Fluid Viscosity is a function of tem	research					
osus / /						
l Notes 1	-					
viscosity density	-					
4/8 is called	mi (market)					
kinematic viscosity	and the same of					
- duldy and it's units are mils	and the second					
Note:	_					
until and unless there are other external forces or						
and unless there are other decenter forces						
pressure difference, du is a constant in the above	-					
	-					
case, as $u = k(y) + c$ and $du = k$ a constant						
Eingham plastic is a viscoplastic material that behaves						
Julium pulsers 5						

				A STATE OF THE PARTY OF THE PAR	
			aces but	nows as	
	as a rigid body at low stresses but flows as				
	as a rigid body at low stress a viscous fluid at high stress				
	a viscous	fuid at	and the same of th		
		a contuni.		,	
	Viscosiby ai	de in momentum.  Liquid decreases  once viscosity of	with incre	are in temp	
			gases increa	ses with	
	shile for	de in decreases liquid decreases gases, viscosity of	this based on	conesive for	
	i aragea in	gases, viscosity of temp c Think on		Sep.	
	in crease		n is trans	ferred in	
		ponent of momentum	Alleria		
+	The x-com	ON			
manufacture the second of the	-y direct	Type = - 4 d. 20x			
		Type = - 4 deshe	JAD = AJ		
		Phear stress	A HA	4	
	ic dorrop ting				
	in ty direction				
			la a	Property	
	Cause	Effect	law	· · · · · · · · · · · ·	
	(0) 11	Holewia Francier	to U.S.		
	velocity	Shear stress	Newton's Law	4	
	Gradient	(Momentum Transfer)			
	n 14 (40 0)	iv and a second			
	Temb.	Heat transfer	Fourier law	k	
4	4 Gradient				
	Cirucas				
	Conc	Mass transfer.	Fick's	Diffuion con	
			law	cm <sup>2</sup> /s)	
100	Giradient		- GLIC	0 /3/	
	to dies in	Por a de la constitución de la c			
				10.61	
	101 101	investor nome velo	- 12 C -	Marc Lott	
	DAB - Hace diffusivity (m2/s)				
		Thermal diffusivity			
	410 - Mometum diffusivity cm2/s)				
Daniel Section of the Control of the	Mass flux	neat flux are	rectors who	le momentun	
and the same of		is tensor			
	II .		The second second second second second second	The state of the s	