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THAPAR INSTITUTE
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Mechanics of Machines
UME 306

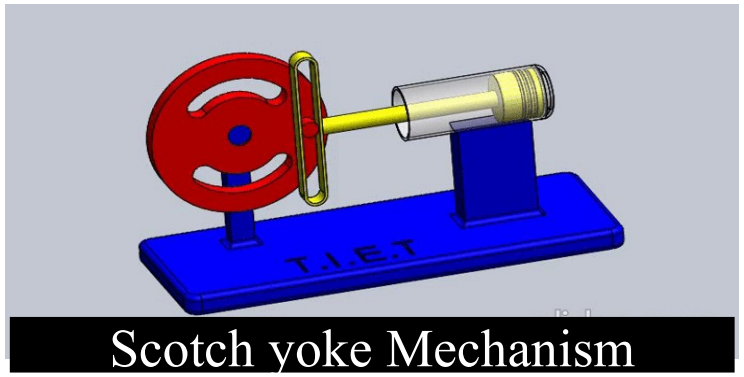
Module - 1
Lecture - 3

Instructional objective

- Types of link
- Types of constrained motions
- Classification of kinematic pair

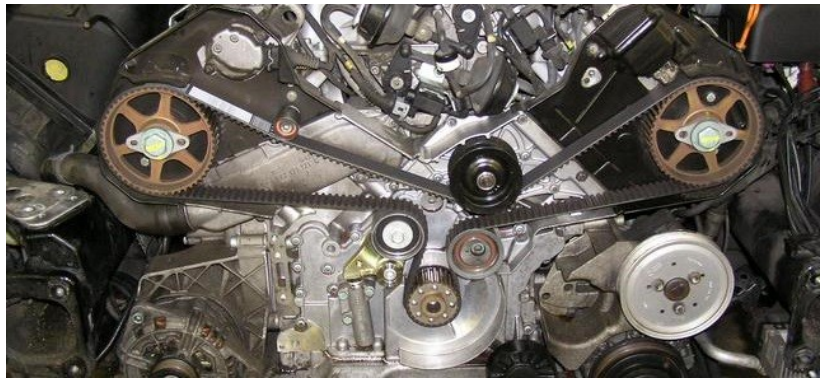
Types of link

1. Rigid link. : which does not undergo any deformation while transmitting motion



Scotch yoke Mechanism

2. Flexible link. : which is partly deformed in a manner not to affect the transmission of motion



3. Fluid link. : which is formed by having a fluid in a receptacle and the motion is transmitted through the fluid by pressure or compression only.

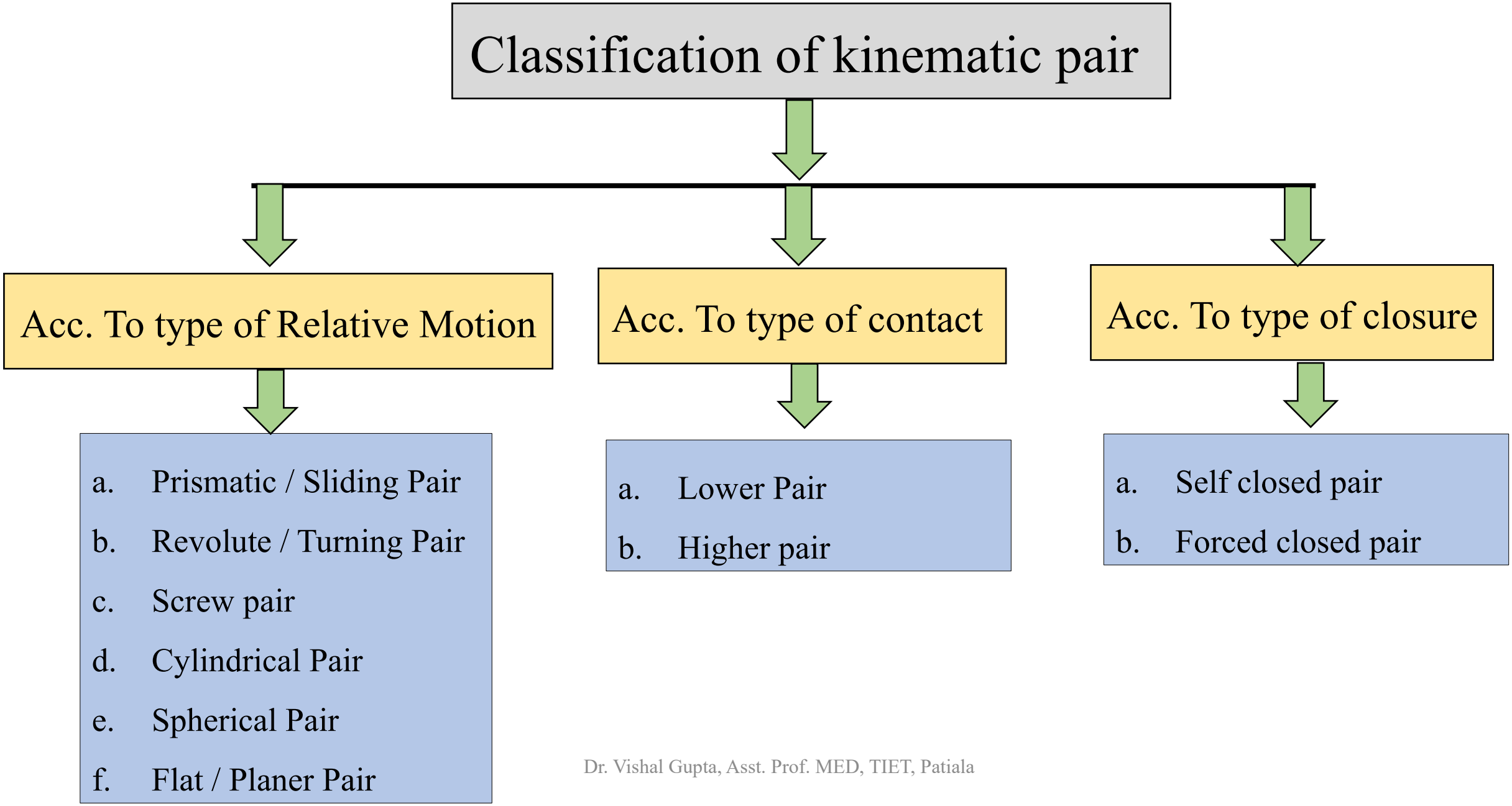
Types of constrained motions

1. ***Completely constrained motion***.

2. ***Incompletely constrained motion.***

3. ***Successfully constrained motion***

Classification of Kinematic pairs



Conti….

According to type of relative motion and pair

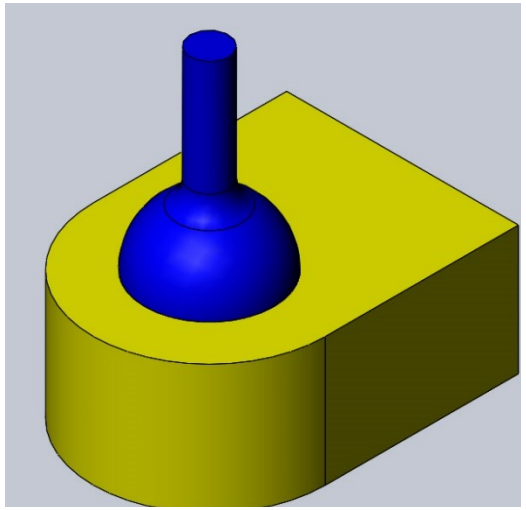
1 – D.O.F

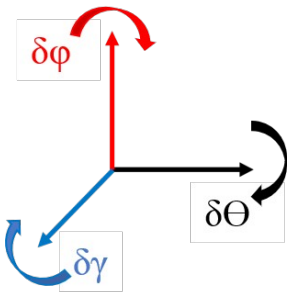
Conti….

According to type of relative motion and pair

(e) Spherical Pair

S: Joint

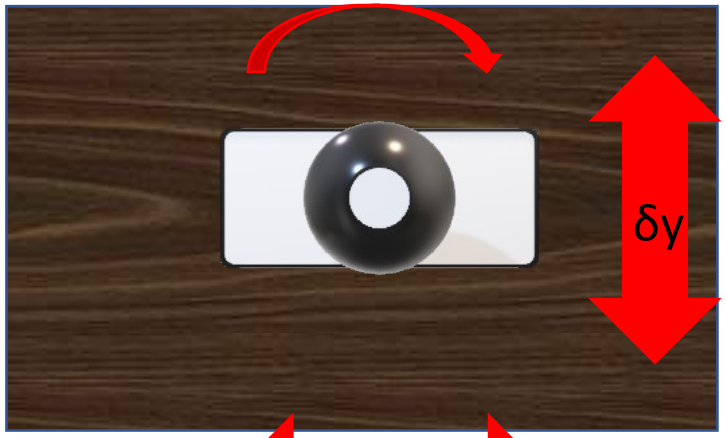


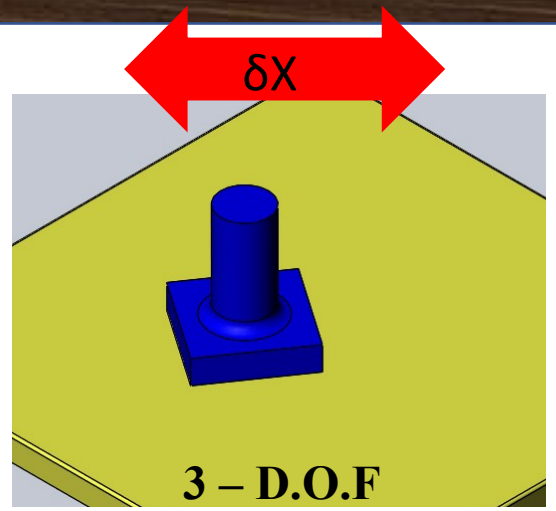


3 – D.O.F

(f) Planer Pair

F: Joint

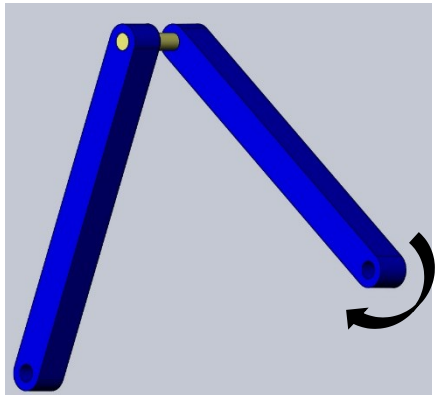




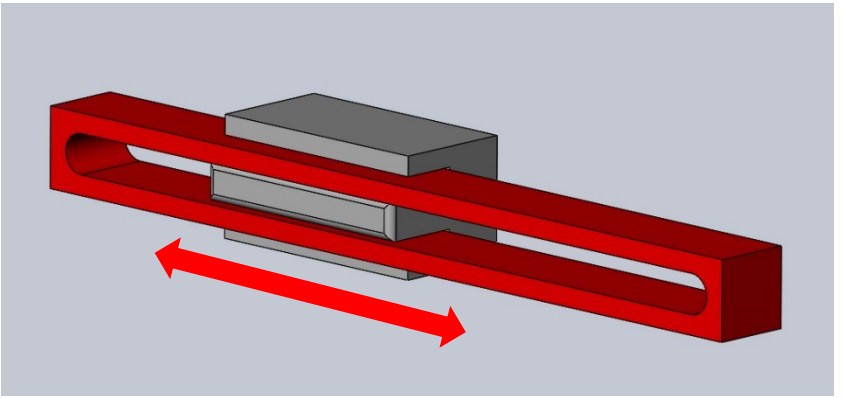
Conti….

According to type of contact:

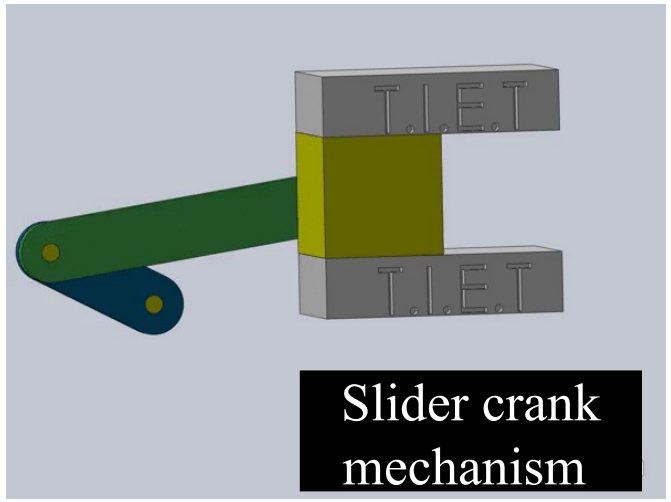
(a) Lower pair:



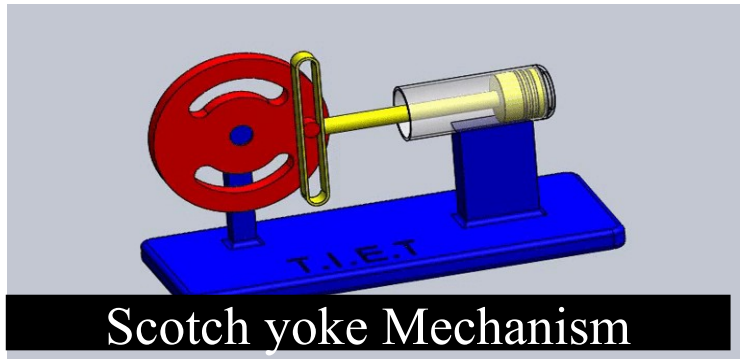
Full joints 1 – DOF



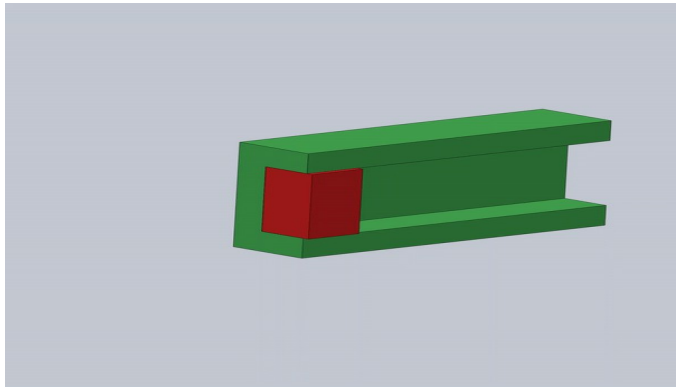
Translating full slider : P Joint



Slider crank mechanism



Scotch yoke Mechanism



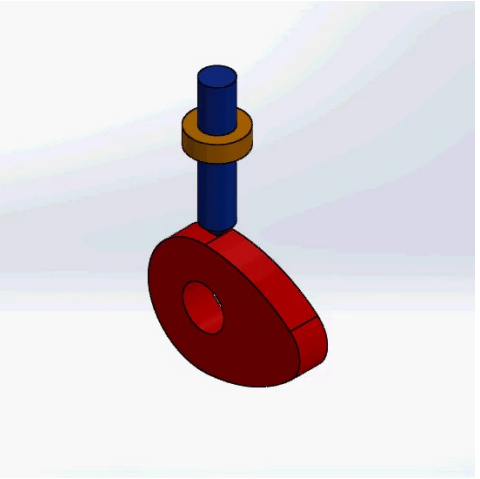
According to type of contact:

(b) Higher pair:

According to type closure :

(a) Self closed pair: When the two elements of a pair are connected together mechanically in such a way that only required kind of relative motion occurs.

The lower pairs are self closed pair.



(b) Force - closed pair: When the two elements of a pair are not connected mechanically but are kept in contact by the action of external forces.

The cam and follower is an example of force closed pair.

Reference Books

1. *Uicker, John Joseph, Gordon R. Pennock, and Joseph Edward Shigley. Theory of machines and mechanisms. Vol. 1. New York: Oxford University Press.*
2. *Norton, Robert L. Design of machinery: an introduction to the synthesis and analysis of mechanisms and machines. Boston: McGraw-Hill Higher Education.*
3. *Rattan, Sarjit S. Theory of machines. Tata McGraw-Hill Education.*
4. *Vinogradov, Oleg. Fundamentals of kinematics and dynamics of machines and mechanisms. CRC press.*
5. *Simón Mata, Antonio, et al. Fundamentals of machine theory and mechanisms. Springer.*

Thanks for watching this video

Save Water Save life