



HW02

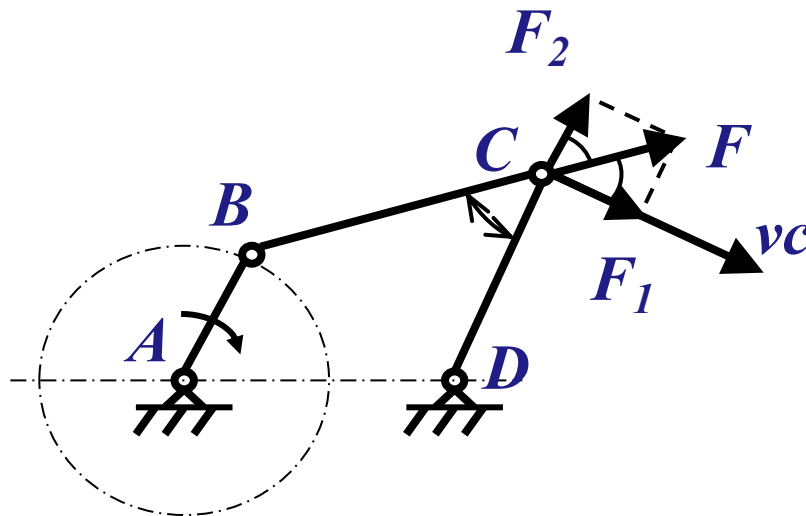
第02章 平面连杆机构 作业

南方科技大学

HW 02.1

- (1) 平面连杆机构中，曲柄的定义是什么？摇杆的定义是什么？
- (2) 按照曲柄、摇杆的数量分类，铰链四杆机构有几种类型？他们各自的判断条件是什么？
- (3) 请在下图中标注出机构的压力角和传动角。

- (1) What is the definition of crank? What is the definition of rocker?
- (2) According to the number of crank and rocker, please list all variations of planar 4R linkage (linkage with 4 revolute joints), and describe the geometric conditions to form each type of them.
- (3) Please point out the pressure angle and the transmission angle in the figure.



HW02.2

1、平面四杆机构中，是否存在死点，取决于_____是否与连杆共线。

- A. 主动件 B. 从动件 C. 机架 D. 摇杆

2、一个K大于1的铰链四杆机构与K=1的对心曲柄滑块机构串联组合，该串联组合而成的机构的行程变化系数K_____。

- A. 大于1 B. 小于1 C. 等于1 D. 等于2

3、在设计铰链四杆机构时，应使最小传动角 γ_{\min} _____。

- A. 尽可能小一些 B. 尽可能大一些 C. 为 0° D. 45°

4、平面连杆机构是由许多刚性体由_____联结而成的机构。

- A. 转动副 B. 高副 C. 低副

HW02.2

1. For a planar four bar linkage, the existence of a dead center is depends on whether the _____ is collinear with the coupler.
A. Input link B. Output link C. Ground D. Rocker
2. A planar 4R linkage ($K > 1$) is combined in series with a centric slider-crank mechanism ($K = 1$), then the coefficient of travel speed variation (K) of the new mechanism is _____.
A. Bigger than 1 B. Smaller than 1 C. 1 D. 2
3. When designing a 4R linkage, the minimum transmission angle, γ_{\min} , should be _____.
A. As small as possible B. As big as possible C. 0° D. 45°
4. A planar 4R linkage connects the rigid links by _____.
A. Revolute joints B. higher pairs C. lower pairs

HW 02.3

如图所示的四杆机构，已知杆CD为最短杆。若要构成曲柄摇杆机构

(1) 若AD为最长杆，机架AD的长度范围是多少？

(2) 若BC为最长杆，机架AD的长度范围是多少？

A four-bar mechanism is shown in the figure, and the bar CD is known to be the shortest bar. If you want to form a crank-rocker mechanism.

(1) If AD is the longest rod, what is the range of lengths of rack AD

(2) If BC is the longest rod, what is the range of lengths of rack AD

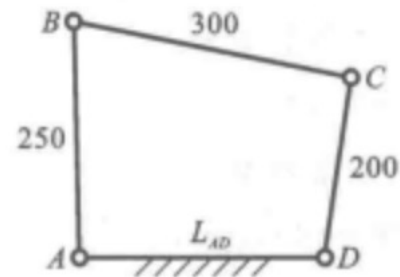


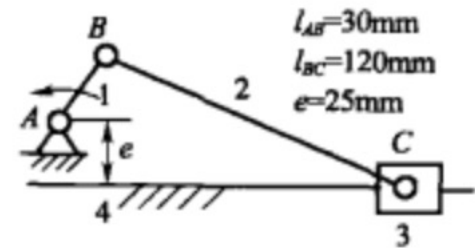
图2-1: 四杆机构
(长度单位为mm)

Fig. 2-1: Four-bar mechanism
(length in mm)

HW 02.4

在图示机构中

- (1) 以构件1为主动件，机构是否会出现死点位置？如果有，请画出机构的死点位置并表明机构的主动是为哪一个构件
- (2) 以构件3为主动件，机构是否会出现死点位置？如果有，请画出机构的死点位置并表明机构的主动件是哪一个构件



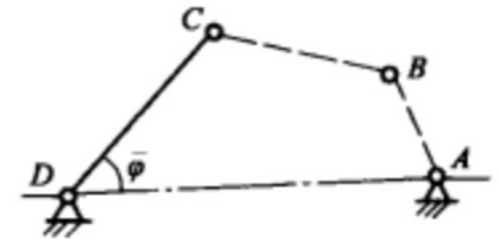
In the illustrated mechanism

- (1) With member 1 as the active member, does the mechanism have a dead center position? If so, draw the dead center position of the mechanism and indicate which member is the active member of the mechanism.
- (2) With member 3 as the active member, does the mechanism experience a dead center position? If so, draw the dead center position of the mechanism and indicate which member is the active member of the mechanism.

HW 02.5

设计一个铰链四杆机构，如图所示，已知摇杆CD的长度为75mm，机架AD的长度为100mm，摇杆的一个极限位置与机架之间的夹角 $\varphi = 45^\circ$ ，构件AB单向匀速转动。当行程速比系数 $K=1$ 时，求

- (1) 构件AB的杆长；
- (2) 构件BC的杆长；
- (3) 摇杆的摆角 ψ 。



Design a hinged four-bar mechanism as shown in Fig. It is known that the length of the rocker CD is 75 mm, the length of the frame AD is 100 mm, the angle $\varphi = 45^\circ$ between one of the limit positions of the rocker and the frame, and that the member AB rotates unidirectionally at a constant speed. When the coefficient of travel-velocity ratio $K = 1$, find

- (1) The rod length of member AB;
- (2) The rod length of member BC;
- (3) The angle of swing of the rocker ψ .



ME311: 机械设计

2023年秋季

Deadline of this homework: Oct 10 @ **23:30**

Link to submission:

https://ancorasir.com/?page_id=3987

All homework MUST be hand-written.

No late submission is allowed!

Please refer to the above link for further details on how to make the submission and the detailed deadline for submission.

谢谢~

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