

# **凸轮-连杆组合机构设计及应用**

## **摘要**

本文主要对凸轮-连杆机构进行分析与设计，凸轮连杆机构按照连接方式分为串联式凸轮-连杆组合机构，并联式凸轮-连杆组合机构，复合式凸轮-连杆机构；按照设计目的分为实现往复移动或摆动的凸轮-连杆组合机构，实现点的轨迹的凸轮连杆组合机构。

首先对实现往复运动的凸轮-连杆组合机构进行设计与应用分析，选择其中实现往复移动的固定凸轮-连杆机构进行设计，给定机构不同初始参数（见表），根据设计原理通过 Matlab 编程得到了连杆的长度和凸轮的轮廓线，并且对其进行了压力角的验算，结果符合许用压力角，满足要求，并且对所设计的凸轮-连杆机构的进行应用分析。

其次对实现点的轨迹的凸轮-连杆组合机构进行设计与应用分析，选择其中直角坐标下的凸轮-连杆组合机构进行设计，给定机构某点的轨迹为椭圆形轨迹，根据设计原理通过 Matlab 编程得到了凸轮的轮廓线，满足要求，并且对所设计的凸轮-连杆机构的进行应用分析。

最后对以上设计的实现不同功能的凸轮-连杆组合机构通过 UG 进行建模并进行运动仿真，仿真的结果复合设计要求。

**关键词：**凸轮-连杆组合机构；MATLAB；UG

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## Abstract

The article mainly analyzes and designs the cam-link mechanism. The cam link mechanism is divided into series cam-link combination mechanism, parallel cam-link combination mechanism, compound cam-link mechanism according to the connection method; the purpose is divided into a cam-link combination mechanism that realizes reciprocating or swinging, and a cam-link combination mechanism that realizes the locus of points.

Firstly, the design and application analysis of the cam-link combination mechanism that realizes reciprocating motion are selected. The fixed cam-link mechanism that realizes reciprocating movement is selected for design. Given different initial parameters of the mechanism (see table), it is programmed by Matlab according to the design principle. The length of the rod and the contour of the cam are obtained, and the pressure angle is checked. The result meets the allowable pressure angle and meets the requirements, and the application analysis of the designed cam-connecting rod mechanism is performed.

Secondly, the design and application of the cam-link combination mechanism that realizes the trajectory of the point are selected. The cam-link combination mechanism under rectangular coordinates is selected for design. The trajectory of a given point of the given mechanism is an elliptical trajectory. Matlab programming obtained the contour line of the cam, which met the requirements, and analyzed the application of the designed cam-linkage mechanism.

Finally, the above-designed cam-link combination mechanism that realizes different functions is modeled and motion simulated by UG, and the simulation results meet the design requirements.

Key words: cam-link combination mechanism; Matlab; UG

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