SYNTHESIS OF A HINGED FOUR-LINKED MECHANISM BY THE METHOD OF MAXIMUM SHRUNKEN EVOLUTE PART I: DEFINITION OF THE INITIAL POSITION OF THE ROCKER

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Abstract: *On the basis of the elements of the kinematic and analytic geometry, a mathematical model for synthesis of a hinged four-link mechanism is composed by combining two advanced methods.*

In Part I of this article, by the output centrode method, a limited area of the initial position of the movable centre of the rocker is determined by the requirement for favourable condition for transmission of the movement.

Keywords: *a hinged four-link mechanism, the output centrode method*

1. Introduction

Generally, the generation of a continuous function of the position or a transfer function can be approximately achieved from lever mechanisms through the so called *approximation synthesis*. This synthesis represents an optimization problem for whose solving different methods can be applied [6].

The determination of the area of the initial position of the rocker and its length is a part of the synthesis of different mechanisms with a four-link topological structure, including hinged four-link mechanisms [3]. This problem has been solved satisfactorily in the synthesis of cam mechanisms, but it has not been applied to lever mechanisms yet.

Until recently, the main dimensions of the cam mechanisms with roller output link were determined mostly by the method of Flocke [7]. This is evidenced by numerous books, monographs and reference books on the theory of mechanisms and machines. The method is graphic and too approximate, especially when it is applied for cam mechanisms with a rocker. This is due to the fact that the particular case for determination of the main dimensions of a cam mechanism with roller slide is the foundation for this more common case.

One natural and computer oriented method using output centrode of the relative movement for determination of the area of the basic geometric parameters of cam mechanisms with rocker is proposed by Galabov [1], [2]. This allows for a functionally suitable mechanism for the angle of transmission of the movement to always be obtained after the synthesis. The method, known as the *output centrode method*, is already reflected in school and scientific literature [3], [4] and successfully approved by illustrative and real examples [5].

The purpose of this publication (Part I) is the application of the method of output centrode for determination of the area of the initial position of the centre of kinematic couple rocker-connecting rod. Thus, the problem of the synthesis of the hinged four-link mechanism is solved.

2. Determination of a limited area of the initial position of the movable centre of the rocker by the requirement for favourable transmission of movement