DISCUSSION

A. G. Erdman[5]

This paper is another worthwhile application of the complex number approach to the synthesis of linkages developed by the second author. The authors utilize a closed form solution which insures location of all possible solutions for each data input. By virtue of the method of elimination employed to solve equations (1–6), there is no need of a compatibility system solution, and consequently the computer time is reduced. The development of example problems, however, is not extensive enough. The synthesized linkages should be analyzed throughout the range of their motion, both to guarantee uninterrupted motion and to provide the actual performance of the cycloidal crank mechanism. Employment of optimal spacing of precision points should produce a "better fit" to the prescribed function than the optimal four-bar linkage over the same range.[6] It is hoped that this further work will be included in the Author's Closure so that the full merit of this method of solution can be appreciated.

---

[5] Graduate Research Assistant, Division of Machines and Structures, Rensselaer Polytechnic Institute, Troy, N. Y.

[6] Freudenstein, F., "Four-Bar Function Generators," *Machine Design*, November 27, 1958, pp. 119-123.

Authors' Closure

The authors wish to thank A. G. Erdman for his kind comments and his interest in the paper. Mr. Erdman is correct in saying our method of solution yields the complete solution in reduced computer time. The examples mentioned in the paper illustrate several applications of the computer design program but are not analyzed for continuity of motion, transmission angles, or structural error between precision points.

The authors have since developed an analysis program for a very similar mechanism. The computer design program in conjunction with the modified analysis program will give the entire picture, including link lengths, assembly, actual output, structural error, minimum transmission angles, dead center points, velocity, acceleration, and a check for discontinuity of motion, sometimes called branching. With the error evaluated for each linkage, the prescribed precision points may be varied in some manner for another computer pass in order to decrease this error. One such manner of choosing these points is by Freudenstein's precision-point respacing formula as described in the reference above. By successive iterations of the cycloidal design and analysis program and the respacing formula, the precision points are spaced so that the total error between all points is minimized.

By outlining the optimal spacing technique, the cycloidal program, as well as other design programs involving prescribed precision points, becomes much more versatile.