A STUDY ON THE KINEMATICS OF A NEW SCHUKEY-TYPE ROTARY COMPRESSOR

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A new type of rotary compressor, called «rotary-chamber compressor», consists of two interlocking rotors with 4 wings each, that perform non-uniform rotary movements. Both rotors have the same direction of rotation, while one rotor is accelerating, the other rotor is retarding. After surpassing a specific mark, the sequence changes and the leading rotor begins to retard and vice versa. Due to the resulting relative phase difference, the volume between the two wings is changing periodically, which allows pulsating working chambers. The technology was first introduced by its founder Jьrgen Schukey in 1987. Since then, no further development on this machine is known to us except our own. In this contribution, a study on the kinematics of the rotary-chamber-compressor is presented. Initial studies have shown that changes in the kinematics of the rotors will have a direct influence on the thermodynamical variables, which, if optimized, can lead to an increased performance of the machine. Therefore, a mathematical model has been developed to obtain the performance parameters from different kinematic concepts by using numerical CFD analysis. Furthermore, additional optimization possibilities will be listed and discussed.

Keywords: rotary-chamber compressor, gearbox with special toothed gears, non-uniform rotary movements, kinematics, compression cycle, mathematical model, CFD analysis.

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