



## **Investigation of polar motion with continuous mathematical functions**

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Geodesy is the Science that relative to determine shape and size of the earth and positioning on or up the earth surface such as satellite. Therefore define a coordinate system for accession to goals of geodesy is necessary. For relative between a point in 3D space and coordinate system, we need to determine 3 parameters: 1) origin 2) axes orientation direct 3) the parameters that defines position of point in a coordinate system One of systems to be used in geodesy, is geocentric coordinate system, that the origin is near the center of the earth and Z axes of coordinate system is in direct axes rotation. Because of rotation of the earth around the Z axes and variation of pole position, Z axes will change. The result, always position of point in 3D coordinate system is a variable. In this paper with using observation of X and Y component of pole from 1962 until 1997 we can research with fitting continuous mathematical functions this none-periodic motion. The results of the paper suggest the following: 1) With certain continuous mathematical functions that used in this paper on Y component, we can investigate polar vector displacement. 2) With computation of coefficient after fitting, we can predict position of pole at future. 3) Between used mathematical functions, sum of six function sinuosity (general model  $\sin^6$ ) has detecting power in pointing of variation of velocity and acceleration of polar motion rather than of them.