

# **DIRECT-TRANSFORMATION OF MAP COORDINATES**

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Nowadays, map overlay is a frequent application and research field of cartography, surveying, remote sensing, urban planning and Geographic Information Systems. Coordinate transformations refer to mathematical processing that enables overlay of digital maps that use different coordinate reference systems, that is, map projections.

The conversion from geographical to map (plane) coordinates is the conventional practice in cartography, which is called a forward transformation.

The inverse transform, which yields geographical coordinates from map coordinates, is a more recent development, due to the need for some custom applications in GIS or in automated cartography by using common data from different map projection systems. The forward and inverse transformation methods are indirect transformation techniques.

The combination of both, transformation of map coordinates on one kind of map projection to another may be called a direct transformation. In this study, a direct transformation exercise is performed between two different World-map projections using various methods.

The Robinson and the Winkel Tripel projections are selected for the case study. Affine transformation, Helmert transformation, Hardy's multiquadric transformation and kriging algorithms are examined for the direct transformation from the Winkel to the Robinson projection and presented with results.