Symbols in Map Projections – A Proposal for Standardization, Ver. 2

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α

azimuth, as angle measured clockwise from the north

a

semimajor axis of the ellipsoid of reference

b

semiminor axis of the ellipsoid of reference

e

(1) first eccentricity of the ellipsoid = $\sqrt{1-\frac{b^2}{a^2}}$

(2) base of natural logarithms, where $e \approx 2.71828$

e′

second eccentricity of the ellipsoid = $\sqrt{\frac{a^2}{b^2}-1}$

f

flattening of the ellipsoid = $\frac{a-b}{a}$

f'

second flattening of the ellipsoid = $\frac{a-b}{b}$

h

relative scale factor along a meridian of longitude

k

relative scale factor along a parallel of latitude

n

(1) cone constant on conic projections, i.e. the ratio of the angle between images of meridians to the true angle

(2) the third flattening of the ellipsoid = $\frac{a-b}{a+b}$

R

radius of the sphere

S

surface area

x

(1) first coordinate in a plane or spatial rectangular coordinate system

(2) rectangular coordinate: distance to the right of the vertical line (y axis) passing through the origin or center of a projection (if negative, it is distance to the left). In practice, a "false" x or "false easting" is frequently added to all values of x to eliminate negative numbers. Note: Many texts use x and y axes interchanged, not rotated, from this convention.

y

(1) second coordinate in a plane or spatial rectangular coordinate system

(2) rectangular coordinate: distance above the horizontal line (x axis) passing through the origin or center of a projection (if negative, it is distance below). In practice, a "false" y or "false northing" is frequently added to all values of y to eliminate negative numbers.

z

(1) third coordinate in a spatila coordinate system

(2) complex number

(3) zenithal distance from North Pole of latitude φ, i.e. $90° - \varphi$, where φ is latitude. Known also as colatitude

ln

natural logarithm, i.e. logarithm to base e, where $e \approx 2.71828$. Note the difference to the first eccentricity of the ellipsoid.

δ

angle measured counterclockwise from the central meridian, rotating about the center of the latitude circles on a normal aspect conic or azimuthal projection

θ

smaller of two angles of intersection between meridian and parallel in a plane of projection

λ

longitude. Longitude values are positive east of Greenwich (or another prime meridian). For longitude west of Greenwich, use negative value.

λ_0

longitude east of Greenwich of the central meridian of the map (for west longitude use a negative value), or longitude chosen as a parameter to define the origin of rectangular coordinates for a projection

λ'

transformed longitude east of the new prime meridian, when graticule is rotated on the globe

ρ

radius of latitude circle on normal aspect conic or azimuthal projection

φ

latitude. Latitude values are positive north of the equator. For latitude south of the equator, use negative value.

φ_0

middle latitude, or latitude chosen as a parameter to define the origin of rectangular coordinates for a projection

φ'

transformed latitude relative to the new poles and equator when the graticule is rotated on the globe

φ_1, φ_2

standard parallels of latitude for projections with two standard paralells. These are true to scale at any point (h=k=1)

φ_1 (without φ_2)

single standard parallel. It is true to scale at any point (h=k=1)

ω

maximum angular distortion at a given point on a projection, $\sin\frac{\omega}{2}=\frac{a-b}{a+b}$

M

radius of curvature at a point on a meridian, $M=\frac{a(1-e^2)}{\sqrt{\left(1-e^2\sin^2\varphi\right)^3}}$, where a is semimajor axis of the ellipsoid of reference, e first eccentricity of the ellipsoid and φ latitude of a point

N

radius of curvature at a point on a parallel, $N=\frac{a}{\sqrt{1-e^2\sin^2\varphi}}$, where a is semimajor axis of the ellipsoid of reference, e first eccentricity of the ellipsoid and φ latitude of a point