

## STEREOGRAPHIC PROJECTION

## Why

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## **Definition**

Let S be the sphere in  $\mathbf{R}^3$  and let N=(0,0,1), the north pole. Then the stereopgraphic projection of  $S-\{N\}$  is the function  $\pi:S-\{N\}\to\mathbf{R}^2$  defined as follows. The point  $\pi(p)$  is the (x,y) values for the point where the line through N and p intersects the plane plane  $P=\{(x,y,z)\in\mathbf{R}^3\}z=0$  (the "xy-plane").<sup>2</sup>

**Proposition 1.** The stereographic projection is a diffeomorphism.

<sup>&</sup>lt;sup>1</sup>Future editions will include, the historical motivation is obviously cartography.

<sup>&</sup>lt;sup>2</sup>Future editions will expand.

