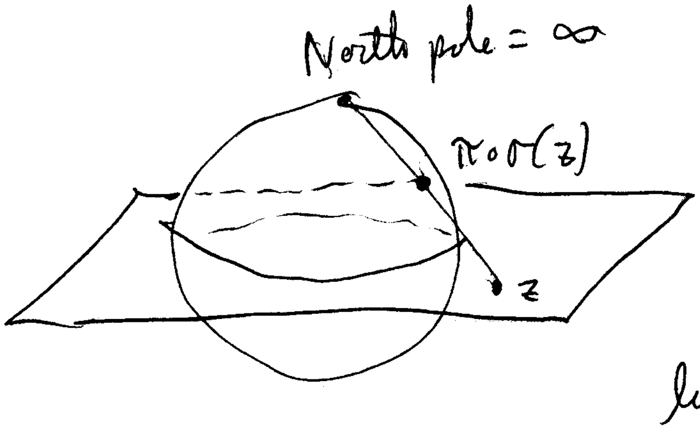

$a^2+b^2+c^2=1$ in $\mathbb{R}^3$ ((a,b,c) coords) and put in $\mathbb{C}$ as $c=0$. Connect $z\in\mathbb{C}$ via a straight line segment to the North pole.

There is a unique intersection, which is $\pi\circ\sigma(z)$. The inverse mapping is called "stereographic projection". So ∞ is naturally seen there as "compactifying" $\mathbb{C}$. By the way, the map "?" in this case is a map $S^3 \to \mathbb{C}P^1 = S^2$ whose fiber is S^1: this is an important example in topology, called the Hopf map.

$S^3 \subset \mathbb{C}^2$

What do the inside of the unit disc (called $\mathbb{E}$ in Remmert) and the upper $\frac{1}{2}$ plane (called $\mathbb{H}$ in Remmert) look like on the sphere? They both look like hemispheres – very much the same, even though one has boundary a circle ($|z|^2=1$) and the other a line ($\mathrm{im}\, z=0$). More explanation: