

1. We can use the natural coordinates on  $S^1$  induced by

2.

3. Cover  $S^2$  by charts  $U_1 = S^2 \setminus \{N\}, U_2 = S^2 \setminus \{S\}$ , with stereographic projection coordinates  $\varphi_1(x, y, z) = (\frac{x}{1-z}, \frac{y}{1-z})$  and  $\varphi_2(x, y, z) = (\frac{x}{1+z}, \frac{y}{1+z})$ . Cover  $\mathbb{CP}^1$  in charts  $V_1 = \{(z_1, z_2) | z_1 \neq 0\}, V_2 = \{(z_1, z_2) | z_2 \neq 0\}$ , with coordinates  $\phi_1(z_1, z_2) = \frac{z_2}{z_1}, \phi_2(z_1, z_2) = \frac{z_1}{z_2}$ .

We check that  $F$  is smooth between each combination of charts:

$U_1, V_1$ :

$U_1, V_2$ :

$U_2, V_1$ :

$U_2, V_2$ :