This is for trying out stuff in LaTeX .

$$
\begin{array}{ccc}
SU(2) & \xrightarrow{\;C_{iH}\;} & SU(2) \\
\downarrow & & \downarrow \\
\mathbf{S} & & U(\mathbb{H}) \\
\downarrow & & \downarrow \\
\mathrm{Rot}(S^2) & \longleftrightarrow & \mathrm{Rot}(S^2_{\mathbb{H}})
\end{array}
$$