Notice that there is a second invariant:

\[ \text{Trace}(Q) = \text{Trace}(R^* Q R^T) = K_1 + K_2 \]

\[
\text{Mean curvature} = \frac{K_1 + K_2}{2}
\]

\[ \text{AARGH!} \]

Gaussian curvature has to do with area (demo w/ piece of paper)

Mean curvature with bending

\[ \begin{array}{c}
\text{Gaussian } 0 \\
\text{Mean } 0
\end{array} \quad \begin{array}{c}
\text{Gaussian } 0 \\
\text{Mean } \neq 0 \neq 0
\end{array} \]

Clearly, there are surfaces of non-zero G.C. and zero M.C.

\[ \Rightarrow \text{here G.C. is always } -ve. \]

At this point, we need more powerful machinery - we don't want to constantly reparametrize.