

Gauss' Theorema Egregium

Theorem: Gaussian curvature K depends only on the first fundamental form coefficients

$E, F, G.$

← Theorema Egregium

Corollary: If $\varphi: S_1 \rightarrow S_2$ is a local isometry, then

$$K_p = K_{\varphi(p)}.$$

↳ follows from fact that if φ a local isometry and (\bar{x}, u) is a chart about \bar{p} , then $(\varphi \circ \bar{x}, u)$ is a chart about $\varphi(\bar{p})$ and in this case

$$E_{\bar{x}}(u, v) = E_{\varphi \circ \bar{x}}(u, v)$$

$$F_{\bar{x}}(u, v) = F_{\varphi \circ \bar{x}}(u, v)$$

$$G_{\bar{x}}(u, v) = G_{\varphi \circ \bar{x}}(u, v)$$

Steps to prove theorem!

we'll
do
this

1. Show T_{ij}^k depend only on E, F, G

as function

2. Show K depends only on T_{ij}^k 's and E, F, G .

we'll
sketch this