L19 0. Plan 1

Plan for ~~Gauss-Bonnet~~ The
last 2 lecture days

1. Prove Gauss-Bonnet II ✓

2. Old business : Geodesic eqns:
$\frac{d\mathcal{V}}{dt} dt = \gamma^* \omega$. in frames

you are 'owed' a proof.
→ will ~~use~~ do case of embedded surface & normal vector, $\vec{N}$.

3. $dN : T_q Q \to T_{N(q)} S^2 \overset{!}{=} T_q Q$

$\det \underbrace{dN_p}_{\text{"shape operator"}} = K(p)$

relation to theorem egregium.

Time permitting

~~4. A forms proof of the Poincaré-Hopf theorem:~~

~~$$\chi(Q^2) = \sum_{p : V(p) = 0} \operatorname{ind}_p(V)$$~~

~~where V is any vector field on Q^2 ~~s.t.~~ all of whose zeros are isolated~~

in special case $\dim Q = 2$.

L19 O, p 2.

Time permitting: last lecture

Poincaré-Hopf

or

(Riemannian) curvature in Higher dims

or

Frame bundles

or

Chow-Rashevskii