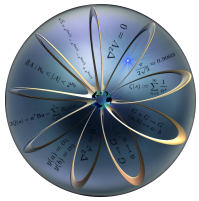

planetmath.org

Math for the people, by the people.

shape operator

Canonical name	ShapeOperator
Date of creation	2013-03-22 16:04:31
Last modified on	2013-03-22 16:04:31
Owner	juanman (12619)
Last modified by	juanman (12619)
Numerical id	6
Author	juanman (12619)
Entry type	Definition
Classification	msc 53A05
Related topic	SecondFundamentalForm

The *shape operator* S of a surface Σ in $\mathbb{R}^3$ is the derivative of the sphere map $N : \Sigma \to S^2$ given by $N(p) =$ unit normal vector field at p. So at each p, $S(p) = d_pN$ and it is the linear transformation $S(p) : T_p\Sigma \to T_{N(p)}S^2$. This is important, because the determinant defines the Gaussian curvature at p in Σ.