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10. Exercise sheet for Numerik für Differentialgleichungen auf Oberflächen

Exercise 23*. Consider the surface evolution described by

$$\begin{aligned} v(x,t) &= -H(x,t)\nu_{\Gamma(X)}(x,t), \\ \frac{\mathrm{d}}{\mathrm{d}t}X(p,t) &= v(X(p,t),t), \\ X(p,0) &= \mathrm{Id}. \end{aligned}$$

Using the identity $-H\nu_{\Gamma(X)} = \Delta_{\Gamma(X)}x_{\Gamma(X)}$, where $x_{\Gamma(X)}$ denotes the identity map on $\Gamma(X)$, derive the weak formulation of the problem.

Discretise the problem using evolving surface finite elements and linearly implicit BDF methods, then implement the resulting scheme.

* Solved together in the tutorial (*Präsenzaufgabe*).

Please, bring your laptops along!

Discussed on the tutorials on 17.07.2018.