Developable surfaces bounded by NURBS surfaces

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In this contribution we address the issue of designing developable surfaces bounded by two NURBS curves, without the restriction of having an explicitly NURBS parametrisation for the surface. With this aim in mind, we perform a reparametrisation of one of the bounding curves and require the resulting ruled surface to be developable.

The developability condition is an algebraic equation for the reparametrisation function, which is a quartic equation for the case of cubic NURBS bounding curves and can be solved either by analytical or standard numerical methods.

This construction provides the most general solution to the problem of designing a developable surface patch between two Bézier or spline curves.

This framework may be extended to comprise approximate developable surfaces.

Joint work with: Alicia Cantón, Eugenia Rosado, María Jesús Vázquez-Gallo.