

About the Scherk Surface with Handle

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This surface is a genus one version of Scherk's doubly-periodic surface. Existence and embeddedness is proved in [KWH], and our formulas are from there.

The conjugate fundamental domain is bounded by straight lines. This piece can be rotated to be a graph over a convex domain, and in this position the original piece is also a graph. For this we suggest the associate family morphing.

The surface has a period problem, because the position of the punctures is not determined on the square torus by qualitative considerations. We suggest the (joint) position of the punctures as morphing parameter (ee), again to illustrate the use of intermediate value arguments for killing periods.

For a discussion of techniques for creating minimal surfaces with various qualitative features by appropriate choices of Weierstrass data, see either [KWH], or pages 192–217 of [DHKW].

[KWH] H. Karcher, F. Wei, and D. Hoffman, The genus one helicoid, and the minimal surfaces that led to its discovery, in “Global Analysis in Modern Mathematics, A Symposium in Honor of Richard Palais' Sixtieth Birthday”, K. Uhlenbeck Editor, Publish or Perish Press, 1993

[DHKW] U. Dierkes, S. Hildebrand, A. Kuster, and O. Wohlrab, Minimal Surfaces I, Grundlehren der math. Wiss. v. 295 Springer-Verlag, 1991