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Sommario/riassunto	Long description: The present thesis introduces a new approach for the generation of C^k-approximants of functions defined on closed submanifolds for arbitrary k in N. In case a function on a surface resembles the three coordinates of a topologically equivalent surface in RÂ³, we even obtain C^k-approximants of closed surfaces of arbitrary topology. The key idea of our method is a constant extension of the target function into the submanifold's ambient space. In case the reference submanifolds are embedded and C^k, the usage of standard tensor product B-splines for the approximation of the extended function is straightforward. We obtain a C^k-approximation of the target function by restricting the approximant to the reference submanifold. We illustrate our method by an easy example in RÂ² and verify its practicality by application-oriented examples in RÂ³. The first treats the approximation of the geoid, an important reference magnitude within geodesy and geophysics. The second and third example treat the approximation of geometric models. The usage of B-splines not only guarantees full approximation power but also allows a canonical access to adaptive refinement strategies. We elaborate on two hierarchical techniques and successfully apply them to the introduced examples. Concerning the modeling of surfaces by the new approach, we derive numerically robust formulas for the determination of normal vectors and curvature information of a target surface which only need

the spline approximant as well as the normal vectors and curvature information of the reference surface.