

Local invariants of maps between 3-manifolds

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We classify invariants of maps from closed 3-manifolds to \mathbb{R}^3 whose increments are defined only by local bifurcations. We show that in the oriented case the space of integer invariants has rank 7, and give a geometric interpretation of its basis. The mod2 setting adds another 4 linearly independent invariants, 3 of which come from the three links constructed from the cuspidal edge and the self-intersection locus of the critical value set. The ranks of the spaces of the integer and mod2 invariants in the case of a non-oriented source turn out to be respectively 4 and 6. The results provide estimates on the ranks of the invariant spaces for an arbitrary target 3-manifold. The proofs are based on the study of bifurcations in generic 1- and 2-parameter families of maps.

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