



Figure 8.1: Invariants of 3-manifolds and the relations between them

invariant for the perturbative invariants; see Figure 8.1 for relations between these invariants. In the figure we also show the present attainments.

References

- [1] E. Abe, *Hopf algebras*, Cambridge University Press, 1980.
- [2] D. Bar-Natan, *Weights of Feynman diagrams and the Vassiliev knot invariants*, preprint, 1991.
- [3] ———, *On the Vassiliev knot invariant*, *Topology* **34** (1995), 423–472.
- [4] J.S. Birman and X.-S. Lin, *Knot polynomials and Vassiliev's invariants*, *Invent. Math.* **111** (1993), 225–270.
- [5] G. Burde and H. Zieschang, *Knots*, *Studies in Mathematics* **5**, De Gruyter, 1985.
- [6] G. Masbaum C. Blanchet, N. Habegger and P. Vogel, *Three-manifold invariants derived from the Kauffman bracket*, *Topology* **31** (1992), 685–699.