

# **Knots, von Neumann Signatures and Grope Cobordism**

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## **Abstract**

We explain new developments in classical knot theory in 3 and 4 dimensions, i.e. we study knots in 3-space, up to isotopy as well as up to concordance. In dimension 3 we give a geometric interpretation of the Kontsevich integral, and in dimension 4 we introduce new concordance invariants using von Neumann signatures. The unifying principle is the concept of a grope cobordism.