

Titolo del corso: Knots, braids and braid equivalences

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Ore frontali di lezione: 10

Periodo di lezione: March 31st 14:00-16:30, April 1st 14:00-16:30, the other two date will be in the period April 8th – April 17th and will be fixed during the first lecture.

Settore disciplinare del corso:

MAT 03 Geometry

Tipologia di corso: Basic

Modalità di verifica dell'apprendimento: seminar

Abstract del corso: The course begins with a comprehensive introduction to knot theory, the notion of isotopy and some useful tools, as well as the Artin braid group and its presentation.

We then present the two classical theorems, the Alexander theorem that provides an algorithm for turning knots and links into closed braids, and the Markov theorem that provides an equivalence relation among braids, reflecting knot isotopy.

We continue with the construction of the Jones polynomial as an application of the above theorems.

We further describe the L -moves, which underpin the Markov moves and have both geometric and algebraic interpretations. The concept of the L -move enables to formulate braid equivalences for isotopic knots and links in various topological settings, where algebraic structures for braids are not necessarily present (knots in handlebodies, in 3-manifolds as well as for virtual and singular knots, focusing in the end in the theory of knotoids and braidoids).

We finally present the plat closure for braids and the plat equivalence, the theorems of Hilden and Birman, and point to generalisations in other diagrammatic settings.