Preliminary Program of the International Conference
«Groups and quandles in low-dimensional topology»
Tomsk State University, Tomsk, June 26-27, 2018

June 26

10:00 – 10:50 Louis KAUFFMAN (Chicago, USA) Virtual Knot Cobordism

Tea/Coffee (20 min)

11:10 – 12:00 Mahender SINGH (Mohali, India) Knots, Quandles and Invariants

12:10 – 13:00 Valeriy BARDAKOV (Novosibirsk, Russia) Residual properties of virtual knot groups

13:00 – 14:00 Excursion
14:00 – 15:00 Lunch

15:00 – 15:50 Andrei VESNIN (Tomsk, Russia) On cyclically presented groups and 3-manifolds

16:00 – 16:30 Tatyana KOZLOVSKAYA (Tomsk, Russia) Heegaard splittings of branched cyclic coverings of connected sums of lens space

16:30 – 17:00 Konstantin GOTIN (Novosibirsk, Russia) Markov theorem for doodles on two-sphere

17:00 - 17:30 Jakov VEREVKIN (Moscow, Russia) Polyhedral products and commutator subgroups of right-angled Artin and Coxeter groups

19:00 Dinner

June 27

10:00 – 10:50 Andrzej ZUK (Paris, France) PDEs, groups and homotopy invariants of closed manifolds

Tea/Coffee (20 min)

11:10 – 12:00 Egor TIMOSHENKO (Tomsk, Russia) Base fields of csp-rings and cardinal characteristics of the continuum

12:10 – 13:00 Andrey CHEKHLOV (Tomsk, Russia) Fully inertly socle-regular Abelian p-groups

13:00 – 15:00 Lunch

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ABSTRACTS

Speaker: **Louis H Kauffman**
Title: Virtual Knot Cobordism.
Abstract: This talk will discuss cobordism of knots and virtual knots. Classical knot cobordism can be defined combinatorially by adding extra moves to the Reidemeister moves corresponding to the birth of an unknotted component, the death of an unknotted component and the movement through a saddle point. We generalize this combinatorial description of knot and link cobordism to virtual knots and links. Combinatorially, virtual knots and links are represented by diagrams with the usual crossings and with virtual crossings corresponding to the immersion of the abstract link diagram into the plane. Generalized Reidemeister moves for virtuals include the classical Reidemeister moves plus detour moves for the virtual crossings. By adding deaths, births and saddles we obtain a theory of virtual link cobordism. Many classical questions and structures generalize. Virtual knots and links bound virtual surfaces and one can ask for the least genus of such a surface. This is called the "four ball genus" $g_{4}(K)$ for a virtual knot of link K. We describe how we use Khovanov homology for virtual knots to determine the g_{4} of positive virtual links, and we describe our recent results about the concordance invariance of the affine index polynomial invariant of virtual knots and links.

Speaker: **Mahender Singh**
Title: Knots, Quandles and Invariants.
Abstract: A basic problem in knot theory is to develop newer and more computable invariants for knots. In this talk, we introduce some knot invariants for tame knots using derivations of quandles. In particular, we obtain a polynomial knot invariant for tame knots which is stronger than the well-known quandle coloring invariant. We will also mention some results about residual finiteness of knot quandles. The results are part of recent joint works with Valeriy Bardakov, Neha Nanda and Manpreet Singh.

Speaker: **Valeriy Bardakov**
Title: Residual properties of virtual knot groups.
Abstract. It is well known that for a classical knot K its group $G(K)$ has a short lower central series, i. e. the second term is equal to the third term. Hence, we can extract only one invariant for knot: $G(K) / [G(K), G(K)] = Z$. For virtual knot groups situation is different. We proved that there are virtual knots with long lower central series. In particular there are knots that have length of the lower central series ω and even ω^2.
This is joint work with Neha Nanda and Mikhail Neshchadim.

Speaker: **Andrei Vesnin**
Title: On cyclically presented groups and 3-manifolds.
Abstract. We consider cyclically presented groups which arise as natural generalizations of Sieradski groups and Fibonacci groups. Many investigations were focused on the problem if a cyclically presented group is fundamental group of a closed oriented 3-manifold. Recently Howie and Williams solved with few exceptions the problem in the case of defining word of length three. We will describe some properties of groups related to cyclic branched covering of 2-brifge knots and the corresponding cyclic presentations.

Speaker: **Tatyana Kozlovskaya**
Title: Heegaard splittings of branched cyclic coverings of connected sums of lens space.
Abstract. We study relations between two descriptions of closed orientable 3-manifolds: as branched coverings and as Heegaard splittings. An explicit relation is presented for a class of

3-manifolds which are branched cyclic coverings of connected sums of lens spaces, where the branching set is an axis of a hyperelliptic involution of a Heegaard surface.

Speaker: **Konstantin Gotin**
Title: Markov theorem for doodles on two-sphere.
Abstract. Doodles are collections of immersed circles in closed oriented surfaces. The notion of a doodle is close to notion of a classical link and M.~Khovanov proved analogue of Alexander's theorem for doodles, here twin groups play the same role as braid groups in the classical knot theory. In this talk we consider the analogue of Markov theorem for doodles on two-sphere.

Speaker: **Yakov Veryovkin**
Title: Polyhedral products and commutator subgroups of right-angled Artin and Coxeter groups.
Abstract. We construct and study polyhedral product models for classifying spacesof right-angled Artin and Coxeter groups, general graph product groups and their commutator subgroups. By way of application, we give a criterion of freeness for the commutator subgroup of a graph product group, and provide an explicit minimal set of generators for the commutator subgroup of a right- angled Coxeter group. This is a joint work with Taras Evgenievich Panov. This work is supported by the Russian Science Foundation under grant 14-11-00414.

Speaker: **Andrzej Zuk**
Title: "PDEs, groups and homotopy invariants of closed manifolds".
Abstract: We present a construction which associates to a KdV equation the lamplighter group. It uses automata and is related the L2 Betti numbers introduced by Atiyah which are homotopy invariants of closed manifolds.

Speaker: **Egor Timoshenko**
Title: Base fields of csp-rings and cardinal characteristics of the continuum.
Abstract. We study base fields of csp-rings and show that they can be sufficiently large. An important role in this study is played by cardinal characteristics of the continuum which are closely related to the concepts of measure and category.

Speaker: **Andrey Chekhlov** and Peter Danchev
Title: Fully inertly socle-regular Abelian p-groups.
Abstract. We define the so-called inertly fully transitive and fully inertly socle-regular Abelian p-groups and study them in a comprehensive way with respect to their crucial properties. The achieved results somewhat continue recent investigations due to the second named author and Goldsmith in Arch. Math. Basel (2009) and J. Algebra (2010), respectively.