

Future Plans

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I plan to continue my research in Representation Theory, Invariant Theory, Combinatorics, and Number Theory.

Representation Theory

- I plan to write a Maple program applying my Diagram Method [1, 2] to finding normal forms, orbits, and invariants of the actions of unipotent Lie groups and nilpotent Lie algebras.
- I plan to publish an article on the Orbit Method for finite groups [3].
- I plan to publish an article on applying my Diagram Method to the Orbit Method for finite groups.
- I plan to write a Maple program applying the Diagram Method to the description of the unitary representations of finite unipotent groups.
- I plan to find a wave graph descriptions of the bases of the invariants of the tensor

powers of the standard representations of other simple Lie groups, a classical series $SO(2n)$ and exceptional groups E_6 , E_7 , E_8 , and F_4 .

- I plan to find a wave graph parametrization of the bases of decomposition of tensor powers of defining representations of $SL(n)$ and $Sp(2n)$ into a sum of irreducible representations, similar to what I did for $SL(2)$ in [4]. The next steps would be to find a wave graph parametrization of the bases of decomposition of tensor powers of other fundamental representations of $SL(n)$ and $Sp(2n)$, then other irreducible representations of $SL(n)$ and $Sp(2n)$, then other classical Lie groups and algebras, then other Kac-Moody algebras, then their quantum analogs.

Invariant Theory

- I would like to extend my description of fractional residues on a line [5] to the multidimensional case of the fractional analogs of Grothendick's residue.
- I would like to find a wave graph parametrization of the bases of invariants of tensor powers of other fundamental representations of $SL(n)$ and $Sp(2n)$ than in [1, 6, 7], then other irreducible representations of $SL(n)$ and $Sp(2n)$, then other classical Lie groups and algebras, then other Kac-Moody algebras, then their quantum analogs.

Combinatorics

- I'd like to finish my work on the enumeration of random walks with fixed oriented area on plane lattices.
- I plan to publish the second part of my work on the enumeration of walks on lattices, continuing [8].

- I would like to find a good asymptotics for the number of spanning trees of the powers of cyclic graphs.

Number Theory

I plan to continue my research of total positivity of series of representations and its applications to the Number Theory, especially to the generalized Riemann hypothesis.

References

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- [6] Alec Mihailovs. Symplectic tensor invariants, wave graphs and S-tris, 1998, math.RT/9803102.
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