國立中山大學應用數學系
學術演講

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講　題：Combinatorial character formula of representations over Lie superalgebras

時　間：2017/03/09（星期四）15:10 16:00

地　點：理學院四樓理 SC 4009-1 室

茶　會：16:00 於理 SC 4010 室 (系辦公室)

摘　要

The Lie superalgebras are generalizations of Lie algebras and are an important tool for physicists in the study of supersymmetries. In particular, their representation theory, have enjoyed a recent surge of considerable interest. This is mainly due to the significant progresses made recently, especially, in the irreducible character problem for fnite-dimensional simple Lie superalgebras since Kac's pioneering works [Kac78] on typical representations of classical Lie superalgebras. Since then the irreducible characters of classical Lie superalgebras in the finite-dimensional modules, and even for modules in the BGG category $\mathcal{O}$ have been worked out in [Ser96, Ser98, Br03, GS10, CLW11, CLW15, BW] .

The aim of this talk is to give a basic introduction to irreducible characters of representations over the general linear Lie superalgebra $\mathfrak{gl}(m|n)$ and the queer Lie superalgebra $\mathfrak{q}(n)$. It will be scheduled to cover the following materials.

i. Basic notions of representation theory including the connection between representations of symmetric group and representations of $\mathfrak{gl}(m|n)$
ii. Combinatorial character formula of representations over $\mathfrak{gl}(m|n)$
iii. Introduction to representations over $\mathfrak{q}(n)$
iv. A combinatorial character formula of $\mathfrak{q}(n)$-representations in the type A blocks (joint work with Prof. Shun-Jen Cheng)

References

[Br03] J. Brundan, *Kazhdan-Lusztig polynomials and character formulae for the Lie superalgebra* $\mathfrak{gl}(m|n)$, J. Amer. Math. Soc. **16** (2003), 185--231.

[BW] H. Bao and W. Wang, *A new approach to Kazhdan-Lusztig theory of type B via quantum symmetric pairs*, arXiv: 1310.0103.

[CLW11] S.-J. Cheng, N. Lam and W. Wang, *Super duality and irreducible characters of ortho-symplectic Lie superalgebras*, Invent. Math. **183** (2011), 189--224.

[CLW15] S.-J. Cheng, N. Lam and W. Wang, *Brundan-Kazhdan-Lusztig conjecture for general linear Lie superalgebras*, Duke Math. J. **110** (2015), 617--695.

[GS10] C. Gruson and V. Serganova, *Cohomology of generalized supergrassmannians and character formulae for basic classical Lie superalgebras*, Proc. Lond. Math. Soc. **101** (2010), 852--892.

[Kac78] V. G. Kac, *Lie superalgebras*, Adv. Math. **26** (1977), 8--96.
[Ser96] V. Serganova, *Kazhdan-Lusztig polynomials and character formula for the Lie superalgebra* $\mathfrak{gl}(m|n)$, Selecta Math. (N.S.) **2** (1996), 607--651.
[Ser98] V. Serganova, *Characters of irreducible representations of simple Lie superalgebras*, Doc. Math., Extra Volume ICM **II** (1998), 583--593.