

Terwilliger algebraの表現とその応用

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Representations of TerwiUiger algebras and their applications

Research Project

All



Project/Area Number

10440003

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

Algebra

Research Institution

Kanazawa University

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Project Period (FY)

1998 – 2001

Project Status

Completed (Fiscal Year 2001)

Budget Amount *help

¥10,000,000 (Direct Cost: ¥10,000,000)

Fiscal Year 2001: ¥2,900,000 (Direct Cost: ¥2,900,000)

Fiscal Year 2000: ¥2,300,000 (Direct Cost: ¥2,300,000)

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Keywords

Research Abstract

The major outcome of this research project, which will be discussed in detail later, is that there was a breakthrough in the area of the non thin representations of Terwilliger algebras of P- and Q- polynomial type. Among others are some pioneering works on the Terwilliger algebras of cyclotomic schemes and the Jacobi sums, on relations between spin models, quantum groups and Terwilliger algebras, on the structure of type II matrices. Let T be a Terwilliger algebra of P- and Q-polynomial type with classical parameters, where the classical parameters mean the ones with one less variables than usual. We obtained the following results. The irreducible T-modules of endpoint 1 have a ladder basis (Hobart-Ito). In the simplest case of parameters, irreducible T-modules are determined via finite dimensional irreducible representations of On sager algebras (Ito-Tanabe-Terwilliger). A basic theorem is obtained for the structure of T-modules, enabling us to deal with the general case by defining the q-analogue of an On sager algebra (q-On sager algebra) (Ito-Tanabe-Terwilliger). Thus in the case of classical parameters, the problem of irreducible T-modules is reduced to the determination of finite dimensional irreducible representations of q-Onsager algebras. If the diameter is 3, finite dimensional irreducible representations of q-On sager algebras are determined via the type (1,1) representations of the affine quantum algebra $U_q(\mathfrak{sl}_2)$. This is the breakthrough mentioned at the beginning and we are aiming at generalizing it to arbitrary diameters.

Report (5 results)

- 2001 Annual Research Report Final Research Report Summary
- 2000 Annual Research Report
- 1999 Annual Research Report
- 1998 Annual Research Report

Research Products (35 results)

All	Other
All	Publications

- [Publications] R.Hosoya, H.Suzuki: "Type II matrices and their Bose-Mesner Algebras"J. Alg. Combin.. (to apper). ▼
- [Publications] T.Ito, K.Tanabe, P.Terwilliger: "Some algebra related to P-and Q-polynomial association schemes"DIMACS Series in Discrete Mathematics and Theoretical Computer Science. 56. 167-192 (2001) ▼
- [Publications] B.Curtin, K.Nomura: "Distance-regular graphs related to the quantum enveloping algebra of $\mathfrak{sl}(2)$ "J. Alg. Combin.. 12. 25-36 (2000) ▼
- [Publications] A.Hiraki: "Retracting argument for distance-regular graphs"J. Combin. Thoery. Ser. B. 79. 211-220 (2000) ▼
- [Publications] H.Ishibashi, T.Ito, M.Yamada: "Terwilliger algebras of Cyclotomic Schemes and Jacobi Sums"Europ. J. Combinatorics. 20. 397-410 (1999) ▼
- [Publications] S.Hobart, T.Ito: "The structure of nonthin ineducible T-modules of end point 1 : ladder bases and classical parameters"J. Algebraic Combinatorics. 7. 53-75 (1998) ▼
- [Publications] R. Hosoya, H. Suzuki: "Type II Matrices and Their Bose-Mesner Algebras"m J. Alg. Combine.. to appear. ▼
- [Publications] T. Ito, K. Tanabe, P. Terwilliger: "Some algebra related to P- and Q-polynomial association schemes"DIMACS Series in Discrete Mathematics and Theoretical Computer Science. 56. 167-192 (2001) ▼
- [Publications] B. Curtin, K. Nomura: "Distance-regular graphs related to the quantum enveloping algebra of $\mathfrak{sl}(2)$ "J. Alg. Combin. 12. 25-36 (2000) ▼
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[Publications] A.Hiraki: "A distance-regular graph with strongly closed subgraphs" J. Alg. Combin.. 14. 127-131 (2001) ▼

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