

# A family of irretractable square-free solutions of the Yang-Baxter equation

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In this talk we will present a new family of non-degenerate involutive set-theoretic solutions of the Yang-Baxter equation. All these solutions are strong twisted unions of multipermutation solutions of multipermutation level at most two. A large subfamily consists of irretractable and square-free solutions. This subfamily includes a recent example of Vendramin [3, Example 3.9]. All of them are counterexamples to Gateva-Ivanova's Strong Conjecture [1, Strong Conjecture 2.28(I)] and also they answer a question of Cameron and Gateva-Ivanova [2, Open Questions 6.13 (II)(4)].

## References

- [1] Gateva-Ivanova, T. A combinatorial approach to the set-theoretic solutions of the Yang-Baxter equation *J. Math. Phys.*, **45**, 3828–3858, 2004.
- [2] Gateva-Ivanova, T. and Cameron, P. Multipermutation solutions of the Yang-Baxter equation *Comm. Math. Phys.*, **309**, 583–621, 2012.
- [3] Vendramin, L. Extensions of set-theoretic solutions of the Yang-Baxter equation and a conjecture of Gateva-Ivanova *J. Pure Appl. Algebra*, **220**, 2064–2076, 2016.