Multi-switches, representations of braid groups and invariants of virtual links.

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The Yang-Baxter equation first appeared in theoretical physics and statistical mechanics in the works of Yang (1967) and Baxter (1972) and it has led to several interesting applications in different fields of mathematics. For example, the Yang-Baxter equation appears in topology (namely, in knot theory) and algebra since it is strongly connected with braid groups. The problem of studying set-theoretical solutions of the Yang-Baxter equation was formulated by Drinfel'd (1992).

In the talk, we will give a short introduction to the Yang-Baxter equation, and introduce a new original way of how solutions of this equation can be used for constructing representations of (virtual) braid groups and invariants of (virtual) knots and links.

Acknowledgments. The work has been supported by the grant of the Russian Science Foundation (project 19-41-02005).