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Twistor geometry and gauge fields. (English) [Zbl 1452.81151](#)

Kielanowski, Piotr (ed.) et al., Geometric methods in physics XXXVII. Workshop and summer school, Białowieża, Poland, July 1–7, 2018. Dedicated to Daniel Sternheimer on the occasion of his 80th birthday. Cham: Birkhäuser. Trends Math., 240-245 (2019).

Summary: In our course we have presented the basics of twistor theory and its applications to the solution of Yang-Mills duality equations. The first part describes the twistor correspondence between geometric objects in Minkowski space and their counterparts in twistor space. In the second part we apply twistor theory to the study of Yang-Mills duality equations on \mathbb{R}^4 . We include a list of references for further study.

For the entire collection see [\[Zbl 1433.53003\]](#).

MSC:

- [81T13](#) Yang-Mills and other gauge theories in quantum field theory
- [81T35](#) Correspondence, duality, holography (AdS/CFT, gauge/gravity, etc.)
- [53C28](#) Twistor methods in differential geometry
- [57P10](#) Poincaré duality spaces
- [14D21](#) Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory)
- [70S15](#) Yang-Mills and other gauge theories in mechanics of particles and systems

Keywords:

[twistors](#); [Yang-Mills fields](#); [Atiyah-Ward theorem](#)

Full Text: [DOI](#)

References:

- [1] M.F. Atiyah, Instantons in two and four dimensions, *Commun. Math. Phys.* 93 (1984), 437-451. · [Zbl 0564.58040](#)
- [2] M.F. Atiyah, *Geometry of Yang-Mills fields*, *Lezioni Fermiane: Scuola Normale Superiore*, Pisa, 1979.
- [3] M.F. Atiyah, R.S. Ward, Instantons and algebraic geometry, *Comm. Math. Phys.* 55(1977), 117-124. · [Zbl 0362.14004](#)
- [4] M.F. Atiyah, V.G. Drinfeld, N.J. Hitchin, Yu.I. Manin, Construction of instantons, *Phys. Lett.* 65A(1978), 185-187. · [Zbl 0424.14004](#)
- [5] M.F. Atiyah, N.J. Hitchin, I.M. Singer, Self-duality in four-dimensional Riemannian geometry, *Proc. Roy. Soc. London* 362(1978), 425-461. · [Zbl 0389.53011](#)
- [6] B.A. Dubrovin, S.P. Novikov, A.T. Fomenko, *Modern Geometry - Methods and Applications*, Springer, 2015.
- [7] S.K. Donaldson, Instantons and geometric invariant theory, *Commun. Math. Phys.* 93(1984), 453-460. · [Zbl 0581.14008](#)
- [8] N.J. Hitchin, G.B. Segal, R.S. Ward, *Integrable systems: Twistors, Loop Groups, and Riemann Surfaces*, Clarendon Press, 1999. · [Zbl 1082.37501](#)
- [9] A.G. Sergeev, *Twistor Geometry and Gauge Fields*, *Proc. Moscow Math. Soc.*, 2018, 135-175. · [Zbl 1451.53062](#)
- [10] R.S. Ward, On self-dual gauge fields, *Phys. Lett.* 61A(1977), 81-82. · [Zbl 0964.81519](#)
- [11] R.S. Ward,

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