Commun. Math. Phys. 122, 35–89 (1989)

Communications in Mathematical Physics

On the Construction of Monopoles for the Classical Groups*

Jacques Hurtubise[1] and Michael K. Murray[2]

[1] School of Mathematics, Institute for Advanced Study, Princeton, N.J. 08540, USA and Department of Mathematics, McGill University, Burnside Hall, 805 Sherbrooke St. W., Montreal, Quebec, Canada H3A 2K6

[2] Department of Mathematics. R.S. Phys. S., The Australian National University, GPO Box 4, Canberra, ACT 2601, Australia

Abstract. For G a classical group, an equivalence is exhibited between:

A) G monopoles over $\mathbb{R}^3$, with maximal symmetry breaking at infinity,
B) families of (rank(G)) algebraic curves in $T\mathbb{P}_1$, along with divisors on those curves, satisfying certain constraints,
C) solutions of Nahm's equations over (rank(G)) intervals, satisfying the appropriate boundary conditions.

A) and B) are linked by twistor techniques, B) and C) via the Krichever method for solving non-linear differential equations, and A) and C) via the ADHMN construction, providing a unified picture of techniques for solution. Amongst other things, an asymptotic formula for the Higgs field of the monopole is computed.

Contents

* Research supported in part by NSERC grant A8361 and FCAR grant EQ3518