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Title. Homotopy type of the moduli spaces of G -Higgs bundles: the real reductive case.

Abstract. For a non-compact reductive Lie group G , the notion of G -Higgs bundles over a compact Riemann surface X , of genus $g \geq 2$, was introduced by Hitchin (80s and 90s). These are appropriate objects for extending the non-abelian Hodge Theorem (the work of Corlette, Donaldson, Hitchin and Simpson) to representations of the fundamental group in a real reductive Lie group G . Motivated partially by this identification, the moduli space of G -Higgs bundles has been extensively studied. Here we give the obstructions to a deformation retraction from the moduli spaces of G -Higgs bundles to the moduli space of semistable principal bundles over X , in contrast with the situation when $g = 1$. The existence of those obstructions allows us to deduce the reducibility of the nilpotent cone of the moduli space of G -Higgs bundles: that is the pre-image of zero under the Hitchin map. This is joint work with Carlos Florentino and Peter Gothen.