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Constructions of co-Higgs bundles in higher dimensions

I will outline a couple of constructions of co-Higgs bundles, which are Higgs bundles whose Higgs fields take values in the tangent bundle. One reason why these objects are interesting is that they are precisely the generalized holomorphic bundles on an ordinary complex manifold considered as a generalized complex one.

One method produces a co-Higgs bundle on any complex manifold; in a sense, this is the canonical co-Higgs bundle. The other is specifically for the projective plane. Recall that one of the earliest constructions of interesting (i.e. indecomposable) rank-2 vector bundles on a complex surface was Schwarzenberger's construction of a vector bundle on the projective plane from a double cover. I will breathe new life into this idea by showing that this bundle carries a natural $\mathcal{O}(1)$ -valued Higgs field, which can be pushed to a T -valued Higgs field on \mathbb{P}^2 . For both examples, we will discuss their stability and deformation theory.