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The rôle of Coulomb branches in 2D gauge theory. (English) Zbl 07445589

Summary: I give a simple construction of the Coulomb branches $\mathcal{C}_{3,4}(G; E)$ of gauge theory in three and four dimensions, defined by H. Nakajima [Adv. Theor. Math. Phys. 20 (2016)] and A. Braverman, M. Finkelberg and H. Nakajima [Adv. Theor. Math. Phys. 22 (2018)] for a compact Lie group $G$ and a polarizable quaternionic representation $E$. The manifolds $\mathcal{C}_{3}(G; 0)$ are abelian group schemes over the bases of regular adjoint $G$-orbits, respectively conjugacy classes, and $\mathcal{C}_{3}(G; E)$ is glued together over the base from two copies of $\mathcal{C}_{3}(G; 0)$ shifted by a rational Lagrangian section $\varepsilon_V$, representing the Euler class of the index bundle of a polarization $V$ of $E$. Extending the interpretation of $\mathcal{C}_{3}(G; 0)$ as “classifying space” for topological 2D gauge theories, I characterize functions on $\mathcal{C}_{3}(G; E)$ as operators on the equivariant quantum cohomologies of $M \times V$, for compact symplectic $G$-manifolds $M$. The non-commutative version has a similar description in terms of the $\Gamma$-class of $V$.

MSC:
81R12 Groups and algebras in quantum theory and relations with integrable systems
14H81 Relationships between algebraic curves and physics
55N91 Equivariant homology and cohomology in algebraic topology
57R58 Floer homology

Keywords:
Coulomb branch; Gromov-Witten theory; boundary conditions

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References:


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