SELF-DUAL EQUATIONS ON RIEMANN SURFACE

ABSTRACT. In this seminar, we are trying to learn basic topics on Higgs bundles, and mainly focus on the relations between Hermitian-Yang-Mills equation and slope stability. The main reference is Hitchin's celebrated paper [Hit87].

0. SCHEDULE

0.1. **Talk 1: Preliminaries on differential geometry (Qiliang Luo 02/27).**
- Principal bundle;
- Connection, curvature of principal bundle.

0.2. **Talk 2: Self-dual equations (Qiliang Luo 03/06).**
- The definition of self-dual equations on principal bundle;
- The existence of solution to self-dual equation implies the stability.

0.3. **Talk 3: Stability of rank two Higgs bundles I (Bowen Liu 03/12).**
- General theory about slope stability;
- Classifications of rank two stable Higgs bundles over projective line and elliptic curve.

0.4. **Talk 4: Stability of rank two Higgs bundles II (Bowen Liu 03/27).**
- Descriptions of rank two stable Higgs bundles over curves of general type.

0.5. **Talk 5: Stability of rank two Higgs bundles III (Baiting Xie 04/02).**
- General criterion for rank two vector bundles over curves of general type to occur in stable pairs.

0.6. **Talk 6: Stability of rank two Higgs bundles IV (Baiting Xie 04/19).**
- General criterion for rank two vector bundles over curves of general type to occur in stable pairs.

0.7. **Talk 7: The stability implies the solution of self-dual equation(Qiliang Luo 04/24).**

References

[Hit87] N. J. Hitchin. The self-duality equations on a Riemann surface. *Proc. London Math. Soc. (3)*, 55(1):59–126, 1987.