

This homework comprises several reading assignments concerning the non-abelian SUSY gauge theories. All the assignments are taken from the *Superspace* book.

1. As a warm-up, read §**6.2.a** about gauge-fixing and ghosts in the ordinary Yang–Mills theory. Then read carefully §**6.2.b** about gauge-fixing and ghosts in supersymmetric Yang–Mills.
2. Next, read §**4.2.a–b** about covariant derivatives in SUSY gauge theories; you will need them to understand the background field method in the next assignment #3.
 - * Optional exercise: After you have finished this whole homework, go back to §**4.2** and read section **c** about the Bianchi identities.
3. Now read §**6.5.a–d** about the background field method and the background-covariant Feynman rules. Please pay attention to the examples of using those rules. In particular, see how a loop made of vector superfields does not diverge at all while the one-loop β -function of the SYM comes from the ghost loops.
4. Finally, read §**6.6.b–c** about dimensional reduction and other UV regulators. I have discussed some of this material in class, but the book gives more details.
 - * Optional exercise: Read §**6.7** to see how the anomaly calculation is done using the point-splitting regulator.