

Plan of lectures by Yuri Sachkov in Fudan University, March-April 2022

«Geometric control theory, sub-Riemannian geometry, and their applications»

1. Examples and statements of control problems
2. Local controllability of nonlinear systems
3. Orbit theorem, Frobenius theorem, Krener's theorem
4. Pontryagin maximum principle
5. Sub-Riemannian geometry on Lie groups
6. Applications of sub-Riemannian geometry to PDEs and metric geometry on Lie groups
7. Applications of geometric control to mechanics, robotics, and vision.

#### References

- [1] Agrachev A.A., Sachkov Yu.L. Control theory from the geometric viewpoint. Berlin Heidelberg New York Tokyo. Springer-Verlag. 2004
- [2] Agrachev, D. Barilari, U. Boscain, A Comprehensive Introduction to sub-Riemannian Geometry from Hamiltonian viewpoint, Cambridge Studies in Advanced Mathematics, Cambridge Univ. Press, 2019
- [3] Yu. Sachkov, Introduction to geometric control (in Russian), URSS Publishers, 2021 (English translation: Springer Verlag, 2022, in print)