

## Presentation

Invariant random subgroups in Lie groups were introduced to deal with the limit multiplicity problem. It follows from a theorem of Stück and Zimmer (relying on a result of Nevo) that in higher rank Kazhdan groups there are only the “obvious” ones arising from lattices and normal subgroups. The goal of these lectures is to explain, starting essentially from scratch, the proof of this result, with perhaps an eye towards the case of higher rank groups without property (T).

## Lecture plan

- Lecture 1: IRS in Lie groups and relation with pmp actions, “Borel density” for IRS, statement of the Stück–Zimmer theorem and application to IRSs in higher rank groups;
- Lecture 2: Lie groups and their parabolic subgroups, measured actions, Margulis factor theorem implies normal subgroup theorem;
- Lecture 3: cocycles, factor theorem of Nevo–Zimmer, proof of the Stück–Zimmer theorem;
- Lecture 4-5: Proof of the Nevo–Zimmer factor theorem.

## References

- Robert Zimmer, *Ergodic theory and semisimple groups*, Birkhäuser, [copy here](#).
- Garrett Stück, Robert Zimmer, *Stabilizers for ergodic actions of higher rank semisimple groups*, Annals of math. 1994, [copy here](#).
- Amos Nevo, Robert Zimmer, *A generalization of the intermediate factors theorem*, J. d'analyse math. 2002, [copy here](#).
- Miklós Abért et al., *On the growth of  $L^2$ -invariants for sequences of lattices in Lie groups*, Ann. of math. 2017, [Arxiv version](#).
- Arie Levit, *The Nevo–Zimmer intermediate factors theorem over local fields*, Geom. Ded. 2017, [Arxiv preprint](#).

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