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Restriction varieties and the rigidity problem. (English) [Zbl 1387.14138]

From the introduction: Homogeneous varieties are ubiquitous in mathematics. Especially the Grassmannians and flag varieties associated to the classical Lie groups play a central role in geometry, representation theory and combinatorics. In this paper, we survey recent developments in two important problems, the restriction and rigidity problems, in the geometry and cohomology of homogeneous varieties following [the author, J. Differ. Geom. 87, No. 3, 493–514 (2011; Zbl 1232.14032); Adv. Math. 228, No. 4, 2441–2502 (2011; Zbl 1262.14059); Clay Math. Proc. 18, 205–239 (2013; Zbl 1317.14107); ibid. 18, 205–239 (2013; Zbl 1317.14107); Isr. J. Math. 200, 85–126 (2014; Zbl 1354.14073)]. These notes grew out of lectures I gave at IMPAN in December 2013. The lectures were organized around the following three themes:

1. Develop a concrete geometric theory of isotopic flag varieties in the spirit of the classical theory of Grassmannians, reducing the theory to a few simple principles of quadric geometry.

2. Construct explicit rational equivalences between subvarieties of homogeneous varieties and unions of Schubert varieties.

3. Use explicit rational equivalences and intersection theory to study rigidity of Schubert classes.

For the entire collection see [Zbl 1382.14002].

MSC:
14M15 Classical problems, Schubert calculus
14M15 Grassmannians, Schubert varieties, flag manifolds