Introduction to Frobenius splitting #2

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We turn to a more global point of view, exploring what it means for a projective variety to be Frobenius split. Frobenius split varieties include Grassmannians, flag varieties, Schubert varieties, Hilbert schemes of points on the projective plane, and many others that arise naturally in representation theory. We will demonstrate some of the very strong and yet remarkably easy to prove consequences of Frobenius splitting, including the fact that the higher cohomology groups of any ample line bundle always vanish. The idea of Frobenius splitting is often attributed to Mehta and Ramanathan, who were the first to systematically exploit it to study projective varieties; We will explain precisely how the global point of view is related to Hochster and Roberts' of F-splitting. We also discuss a global version of F-regularity, and outline the proof of a recent theorem of the speaker and Karl Schwede which characterizes the F-regular projective varieties as essentially the log Fano varieties.