

“POINTS RATIONNELS, COURBES RATIONNELLES ET COURBES ENTIÈRES SUR LES VARIÉTÉS
ALGÈBRIQUES” *Programme thématique :*
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Thematic program:
RATIONAL POINTS, RATIONAL CURVES AND ENTIRE HOLOMORPHIC CURVES ON ALGEBRAIC
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From rational curves to rational points over global function fields

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This mini-course will explain how to “transport” results about rational curves in complex projective varieties to results about existence of rational points of varieties defined over global function fields, e.g., $F_p(t)$. The two key ingredients are (1) work of Esnault, *et al.*, deducing existence of rational points of varieties over global function fields from a Hodge-theoretic / motivic property, “coniveau 1”, for complex projective varieties, and (2) the property of “rational simple connectedness” investigated by de Jong, He and myself. Using this, Chenyang Xu and I give new, uniform proofs of three results over a global function field K : Lang’s theorem that K is C_2 , a theorem of Brauer–Hasse–Noether that twisted forms of the Grassmannian over K have rational points, and the split case of Serre’s “Conjecture II” / Harder’s theorem over K . The emphasis will be on how to verify the geometric conditions over C necessary to deduce theorems over K .

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