Y. I. Manin's seminars in Moscow

After notes and recollections by V. Berkovich, I. Cherednik,
V. Drinfeld, M. Kapranov, V. Shokurov,
Y. Tschinkel, A. Voronov, Y. Zarhin

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1968-69

- Course on modular forms

1969-70

- Course on K-theory + related seminar (Fall 69)
  - Book: K-functor in Algebraic Geometry, Moscow Univ. Publ. 1971.
- Course on cubic (hyper)surfaces (Spring 70)
  - Book: Cubic Forms, Moscow 1972.

1970-71

- Course on scheme theory (including Grothendieck's theory of flat descent)
- Course on Iwasawa invariants and Γ-extensions

1971-72

- Course on analytic number theory (maybe at the end Manin also lectured on Matiyasevich's solution of Hibert's 10-th problem)
- Seminar (joint with I. I. Piatetski-Shapiro) on modular and automorphic forms
- Seminar on birational geometry (joint with V. A. Iskovskikh)

1972-73

- Course on p-adic analysis.
- There was a seminar which was probably called "diophantine geometry"; one of the talks was about "Markov chains", in the sense of Markov numbers and Markov trees (not probability theory). Later became prominent in theory of exceptional bundles.

1973-74

Drinfeld: I have no records; that was the year when Manin was very sick. Presumably, he started to teach a course on the book by Jacquet-Langlands, but then he fell ill and had to quit.

1974-75

- Course on algebraic K-theory.
- Seminar on the Selberg zeta-function and the related notions of Reidemeister torsion and analytic torsion (S. Vishik one of the speakers).

1975-76

- Course on integrable systems.
- Seminar on number theory automorphic forms. This seems to have been the seminar when Drinfeld and Cherednik have given talks on each other's work. Cherednik's work was about p-adic uniformization, and Drinfeld's talk probably included its interpretation in his paper "Coverings of p-adic symmetric domains".

1976-77

- Seminar on mathematical physics (integrable systems and some questions of quantum field theory)
- Another seminar on diophantine geometry.

1977-78

- Course on mathematical physics ("physics literacy", integrable systems. and Yang-Mills theory).
  - Book: Mathematics and Physics (1979), later incorporated in "Mathematics as Metaphor" (2008).
  - First (introductory) lecture did not make it into the books.
- Seminar on the same subject.

Manin's intro lecture on Physics, Fall 1977 (after notes of V. Drinfeld)

Metaphor: A mathematician studying physics $\sim$ a Martian trying to understand human ethics.

Two sources (for a Martian):

- Aesop's fables.
- Spinoza's treatise on ethics.

Manin: These match two standard sources for studying physics:

- Feynman's lectures $\sim$ Aesop.
- Landau-Lifschitz $\sim$ Spinoza.

Spinoza $\leftarrow$ Euclid's Elements $\rightarrow$ Bourbaki's Elements $\sim$ LL

1980-81

- Course: Geometric structure of Physics. Yang-Mills theory, twistor transform, Einstein equations.
- Seminar: Differential equations. I. Skornyakov on Sato's Holonomic Quantum Fields, M. Shubin on hyperfunctions and microfunctions.
- Seminar: Algebraic Geometry. A. Tyurin on moduli of instantons, A. Vaintrob on foliations, I. Cherednik on Yang-Baxter equations. S. Gelfand on Intersection Homology.
- Seminar: Diophantine geometry. A. Beilinson and V. Schechtman on higher K-theory, its char. classes, Riemann-Roch.

1982-83

- Seminar: Diophantine Geometry. Algebraic K-theory, A. Beilinson on regulators, V. Schechtman on delooping of K-theory spaces.
- Seminar: Algebraic Geometry. B. Feigin on Kac-Moody and Virasoro algebras, M. Wodzicki on infinite determinants.

1983-84

- Course: Applied Algebra. Algebro-geometric codes.
- Seminars: Algebraic Geometry, Diophantine Geometry.

1984-85

- Course: Kac-Moody algebras.
- Seminar: Algebraic Geometry. B. Feigin on vertex operators, Kac-Moody algebras, Rogers-Ramanujan. M. Wodzicki on the noncommutative residue.
- Seminar: Diophantine Geometry. N. Koblitz on work of Tunnell, A. Beilinson on Mazur-Wiles. J. Nekovar on exotic Weil representations.

1985-86

- Course; Algebraic Methods in Physics: strings, exceptional groups, role of Bott periodicity. Quantum groups.
- Seminar: Algebraic Geometry. V. Schechtman on Toledo-Tong's approach to Riemann-Roch (twisted complexes)
- Seminar: Diophantine Geometry. A. Beilinson on Grayson's reduction theory, Gillet-Soule characteristic classes in Arakelov geometry, A. Panchishkin on p-adic zeta functions for modular forms, Y. Manin on holomorphic capacity abd value distribution, A. Beilinson on Faltings' work on p-adic Hodge theory.
    - Book: K-theory, Arithmetic and Geometry (Manin's Seminar), Springer Lecture Notes 1289.

1986-87

- Course: Algebraic questions of physics. Quantum groups, categorical aspects of the Yang-Baxter equation.
- Seminar: Algebraic Geometry. A. Beilinson: Riemann-Roch via Atiyah algebras, I. Zakharevich on Penner's cell decomposition of Teichmüller spaces.
- Seminar: Diophantine Geometry. D. Zagier on $\zeta(3)$. A. Beilinson on the Deligne (-Beilinson) cohomology.

1987-88

- Course: Supplementary Chapters of Homological Algebra
  - Book: S. I. Gelfand, Y. I. Manin, Methods of Homological Algebra.
- Seminar: Algebraic Geometry
- Seminar: Diophantine Geometry

1988-89

- Course: Questions of algebraic geometry.
- Course: Heights and diophantine geometry.
- Seminar: Diophantine geometry.

1989-90

- Course: Noncommutative geometry
- Seminar: Diophantine geometry