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Surveys the very active field of Calabi-Yau varieties from a geometric and arithmetic perspective

Includes four introductory lectures that can be used by graduate students and other researchers as a guide to the field
Contains a varied selection of topics from pure arithmetic questions to geometric questions to Hodge theory
In recent years, research in K3 surfaces and Calabi-Yau varieties has seen spectacular progress from both the arithmetic and geometric points of view, which in turn continues to have a huge influence and impact in theoretical physics_in particular, in string theory. The workshop on Arithmetic and Geometry of K3 surfaces and Calabi-Yau threefolds, held at the Fields Institute (August 16-25, 2011), aimed to give a state-of-the-art survey of these new developments. This proceedings volume includes a representative sampling of the broad range of topics covered by the workshop. While the subjects range from arithmetic geometry through algebraic geometry and differential geometry to mathematical physics, the papers are naturally related by the common theme of Calabi-Yau varieties. With the large variety of branches of mathematics and mathematical physics touched upon, this area reveals many deep connections between subjects previously considered unrelated.

Unlike most other conferences, the 2011 Calabi-Yau workshop started with three days of introductory lectures. A selection of four of these lectures is included in this volume. These lectures can be used as a starting point for graduate students and other junior researchers, or as a guide to the subject.

Content Level » Research

Keywords » $K3$ surfaces and Enriques surfaces - Calabi-Yau manifolds - cycles and subschemes - variation of Hodge structures

Related subjects » Algebra - Geometry & Topology - Number Theory and Discrete Mathematics

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