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VIASM – The Vietnamese Institute of Advanced Study in Mathematics, Hanoi

Mathematics in Vietnam goes back to ancient times. Over five hundred years ago in Hanoi the name of Luong Thê Vinh, an expert in geometry, was inscribed on a stele of honor in Văn Miếu.

Over sixty years ago, the Việt Minh published a geometry textbook written by Hoàng Tuy for schools in the liberated zones, a rare case of a guerrilla press publishing a mathematics book!

Founded in 2010 after the award of the Fields Medal to Ngô Bảo Châu, the Vietnam Institute for Advanced Study in Mathematics VIASM officially opened in Hanoi in 2011, aiming to become a leading research center where Vietnamese mathematicians can develop projects and nurture young talent. Ngô Bảo Châu, one of the initiators, became the scientific director in 2011.

VIASM engages in traditional research areas of pure and applied mathematics, as well as applying mathematics in other fields such as physics, computer science, biology and economics. The main activity of the Institute is the organization of research groups to conduct high quality research programs and projects. International and Vietnamese scientists in the same field gather and work together at the Institute. VIASM organizes conferences, workshops, seminars on topics associated with research groups working at the Institute, special schools for mathematics students, short-term training courses for mathematics teachers and common activities to disseminate scientific knowledge to the public and support the application of mathematics in socio-economic development.

The VIASM subseries of the Lecture Notes in Mathematics publishes high quality original articles or survey papers on topics of current interest. They are based on lectures delivered in special periods organized at the Vietnam Institute for Advanced Study in Mathematics (VIASM). With the agreement of the Editors of the LNM Series, and as a temporary arrangement, the first volumes are not subjected to the strict LNM rules of coherency for multi-author volumes.

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Introduction

The algebraic topology activities at the Vietnam Institute for Advanced Study in Mathematics (VIASM) have been organized every other year, in 2013, 2015, and 2017, since the institute's establishment. These sessions reflect the healthy cooperation between the Vietnamese and overseas schools in homotopy theory.

The three articles comprising this volume are expanded versions of courses given during the algebraic topology at VIASM by H.-W. Henn, G. Powell, and G. Ginot.

In addition to the courses covered by this book, lectures on and activities about algebraic topology at VIASM have also been conducted by M. Hill (on the Kervaire invariant problem), A. Touzé and V. Franjou (on functor homology), and B. Fresse (on operads) and two courses have been presented by J. Lannes on group cohomology. During these activities and during Lannes' visits, various seminars were given.

Although these notes contain some new results and new presentations (particularly in Ginot's article), their primary purpose is to provide easier access to some recent topics, both to the Vietnamese algebraic topology community and more widely to all algebraic topologists.

The topics covered may be divided into two groups: stable homotopy, unstable module theory, and chromatic homotopy theory (Henn and Powell) on the one hand; and string and brane topology (Ginot) on the other hand.

Henn's article provides an introduction to localization with respect to Morava K -theories and how the cohomology of the Morava stabilizer group can give access (via a spectral sequence) to the homotopy of the localization. This is a very welcome and clearly written self-contained survey which introduces readers to the more technical literature.

Powell's article is concerned with derived functors of the destabilization and iterated loop functors for unstable modules and gives a small complex that allows their computation. Details are also given concerning the odd prime case. This is a subject which is well known to the Vietnamese school in homotopy theory.

Ginot's article is a widely expanded version of his introductory course on "string and brane topology" and higher Hochschild homology, providing some new results. It presents a much-needed summary of the main results and constructions in the

field, filling a gap in the expository literature. This easy-to-read article will be useful to both students and experts in the field.

The editors wish to warmly thank the scientific director, the managing director, and the staff of VIASM for their hospitality and efficiency and for the pleasant working conditions of the institute. This applies both to the abovementioned algebraic topology activities and to more recent ones, in particular the session held in Talinpa (Tuan Chau) in 2016, which provided exceptional working conditions for a small group of researchers and students.

Hanoi, Vietnam
Villetaneuse, France

Nguyễn H.V. Hùng
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