

# Table of Contents for SURV/217

## Homotopy of Operads and Grothendieck–Teichmüller Groups

- Contents for Part 1
- From operads to Grothendieck–Teichmüller groups. The general theory of operads
  - ◆ The basic concepts of the theory of operads
  - ◆ The definition of operadic composition structures revisited
  - ◆ Symmetric monoidal categories and operads
- Braids and  $E_2$ -operads
  - ◆ The little discs model of  $E_n$ -operads
  - ◆ Braids and the recognition of  $E_2$ -operads
  - ◆ The magma and parenthesized braid operators
- Hopf algebras and the Malcev completion
  - ◆ Hopf algebras
  - ◆ The Malcev completion for groups
  - ◆ The Malcev completion for groupoids and operads
- The operadic definition of the Grothendieck–Teichmüller group
  - ◆ The Malcev completion of the braid operads and Drinfeld's associators
  - ◆ The Grothendieck–Teichmüller group
  - ◆ A glimpse at the Grothendieck program
- Appendices
  - ◆ Trees and the construction of free operads
  - ◆ The cotriple resolution of operads
  - ◆ Glossary of notation
  - ◆ Bibliography
  - ◆ Index
- Contents for Part 2
- Homotopy theory and its applications to operads. General methods of homotopy theory
  - ◆ Model categories and homotopy theory
  - ◆ Mapping spaces and simplicial model categories
  - ◆ Simplicial structures and mapping spaces in general model categories
  - ◆ Cofibrantly generated model categories
- Modules, algebras, and the rational homotopy of spaces
  - ◆ Differential graded modules, simplicial modules, and cosimplicial modules
  - ◆ Differential graded algebras, simplicial algebras, and cosimplicial algebras
  - ◆ Models for the rational homotopy of spaces
- The (rational) homotopy of operads
  - ◆ The model category of operads in simplicial sets
  - ◆ The homotopy theory of (Hopf) cooperads
  - ◆ Models for the rational homotopy of (non-unitary) operads
  - ◆ The homotopy theory of (Hopf)  $\Lambda$ -cooperads
  - ◆ Models for the rational homotopy of unitary operads
- Applications of the rational homotopy to  $E_n$ -operads
  - ◆ Complete Lie algebras and rational models of classifying spaces
  - ◆ Formality and rational models of  $E_n$ -operads
- The computation of homotopy automorphism spaces of operads
  - ◆ Introduction to the results of the computations for the  $E_n$ -operads
- The applications of homotopy spectral sequences
  - ◆ Homotopy spectral sequences and mapping spaces of operads
  - ◆ Applications of the cotriple cohomology of operads
  - ◆ Applications of the Koszul duality of operads

- The case of  $E_n$ -operads
  - ◆ The applications of the Koszul duality for  $E_n$ -operads
  - ◆ The interpretation of the result of the spectral sequence in the case of  $E_2$ -operads
- Conclusion: A survey of further research on operadic mapping spaces and their applications
  - ◆ Graph complexes and  $E_n$ -operads
  - ◆ From  $E_n$ -operads to embedding spaces
- Appendices
  - ◆ Cofree cooperads and the bar duality of operads
  - ◆ Glossary of notation
  - ◆ Bibliography
  - ◆ Index