GT Talk

Braids and the Grothendieck-Teichmuller Group
University of Toronto's Symplectic Geometry Seminar
Monday, January 10 2010, 2PM

Abstract. The "Grothendieck-Teichmuller Group" (GT) appears as a "depth certificate" in many recent works - "we do A to B, apply the result to C, and get something related to GT, therefore it must be interesting". Interesting or not, in my talk I will explain how GT arose first, in Drinfel'd's work on associators, and how it can be used to show that "every bounded-degree associator extends", that "rational associators exist", and that "the pentagon implies the hexagon".

In a nutshell: the filtered tower of braid groups (with bells and whistles attached) is isomorphic to its associated graded, but the isomorphism is neither canonical nor unique - such an isomorphism is precisely the thing called "an associator". But the set of isomorphisms between two isomorphic objects *always* has two groups acting simply transitively on it - the group of automorphisms of the first object acting on the right, and the group of automorphisms of the second object acting on the left. In the case of associators, that first group is what Drinfel'd calls the Grothendieck-Tiechmuller group GT, and the second group, isomorphic but not canonically to the first and denoted GRT, is the one several recent works seem to refer to.

Almost everything I will talk about is in my old paper "On Associators and the Grothendieck-Teichmuller Group I, also at arXiv:q-alg/9606021.

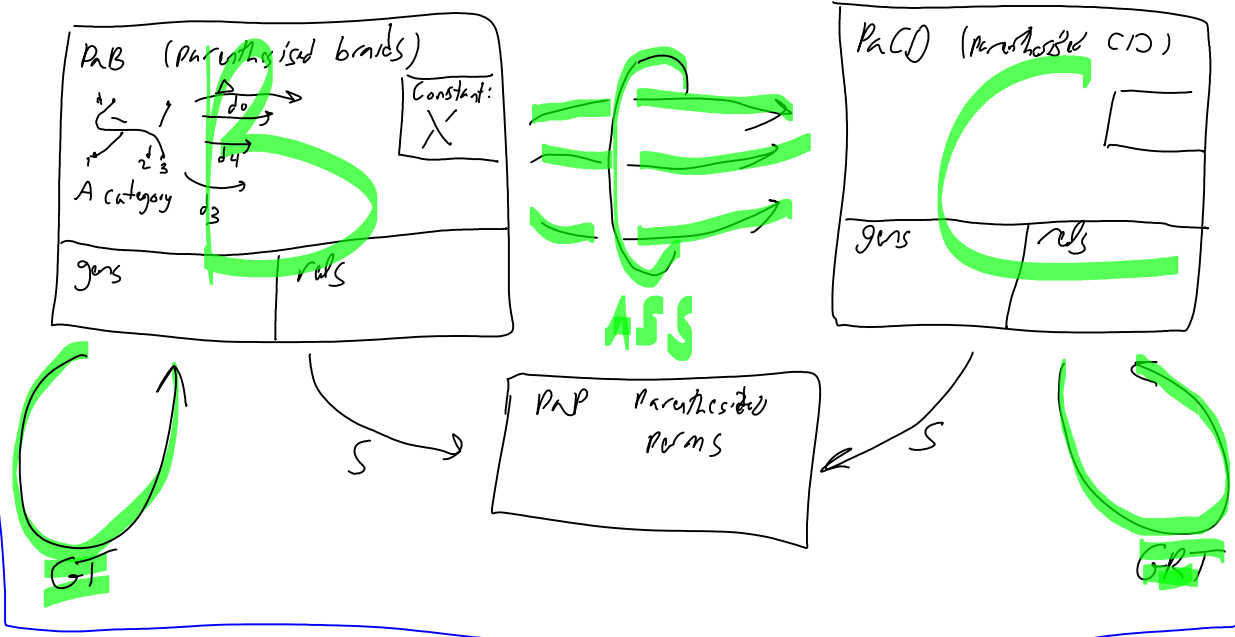1. Flash the Drinfel'd - GT formulas.

2. Flash the $GB \rightrightarrows C \circlearrowleft$ pictures.

3. Homomorphic expansions for general algebraic structures.   (Utility for problem solving.)

4. The braid group and its gr
                    (Duality with finite type inv)

5. The Main Course

6. Assorted further formulas.

Starters	Treats

The Main Course

Jan 9 to do:

1. Add the "braid" Theorem. "Baby Example".
2. Add statement & sketch of proof for the main theorem.
3. Partition the handout.