Indigenous bundles, deformation data and Hurwitz curves with bad reduction

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joint work with Irene Bouw

In my talk I will try to give an overview of our papers [1], [2], [3].

In [1], we study three point covers of the projective line (i.e. dessins d'enfants) whose monodromy group is embedded in the linear group $GL_2(\mathbb{F}_p)$ and which have bad reduction modulo p. We find that a certain differential form in characteristic p associated to such a cover (we call it a *deformation datum*) is strongly related to a certain hypergeometric differential equation. The relation between the three point cover and the Riemann scheme of the associated differential equation is totally explicit, and this has interesting consequences.

In [1] we generalize the above correspondence between deformation data and differential equations. More precisely, we set up an equivalence between deformation data and indigenous bundles with nilpotent p-curvature. The latter objects have been studied by Mochizuki in the context of his p-adic Teichmüller theory; they correspond essentially to rank two differential equations with specific properties. The equivalence we establish is suggested by work of Ihara.

In the light of [1], it is natural to ask whether one can explicitly describe the indigenous bundles/differential equations associated to three point covers whose monodromy group is not a subgroup of $GL_2(\mathbb{F}_p)$. In search for suitable examples, it is also natural to consider three point covers which are Hurwitz curves. If times permits it, I will present some recent examples which have been worked out by Irene Bouw in [3].

References

[1] I. I. Bouw and S. Wewers. Stable reduction of modular curves. In *Modular curves and abelian varieties*, volume 224 of *Progr. Math.*, pages 1–22. Birkhäuser, 2004.

[2] I. I. Bouw and S. Wewers. Indigenous bundles with nilpotent p-curvature. *Internat. Math. Res. Not.*, volume 2006, pages 1-37, 2006.

[3] I. I. Bouw. Pseudo-elliptic bundles, deformation data, and the reduction of Galois covers. Habilitation thesis, available from http://www.math.uni-duesseldorf.de/~bouw.