1026-81-70 **Charlotte Hardouin*** (charlotte.hardouin@gmail.com), Im Neuenheimer Feld 370, Appt 90, 69120 Heidelberg, Germany. *Iterative q-difference Galois Theory.* Preliminary report.

For the beginning, the Galois theory of q-difference equations has been built for q non equal to a root of unity. This choice was made for not increasing the field of constants to a transcendental field. However, Peter Hendricks, has studied this problem for $q^m = 1$ in his PhD work under the supervision of Marius van der Put. Bu he built a fiber functor from the category of q-difference modules over $\mathbb{C}(z)$ with value in the category $Vect_{\mathbb{C}(z^m)}$ of vector spaces of finite dimension over $\mathbb{C}(z^m)$. But this construction is not totally satisfying and to stay in the spirit of Kolchin, we do not want to have such transcendental base fields for Galois groups.

For q-difference theory, the problem is not the characteristic but the roots of unity. Inspired by the work of B.H. Matzat and Marius van der Put for Differential Galois theory in positive characteristic, we consider also a family of *iterative difference operator* instead of considering, just one difference operator, and by this way we stop the increasing of the constant field and succeed to set up a Picard-Vessiot Theory for q-difference equations where q is a root of unity and relate it to a Tannakian approach.

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