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On non-commutative Picard-Vessiot extensions

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Picard-Vessiot theory allows studying symmetries of linear functional equations. The most studied classes of equations are those of linear differential and difference equations. In both cases the Galois groups are affine group schemes. This talk is concerned with a generalization of these theories, which encompasses a bigger class of linear functional equations. An important example are those linear functional equations containing an endomorphism σ and a σ-derivation ∂ (a linear map ∂ fulfilling $\partial(ab) = \partial(a)\sigma(b) + a\partial(b)$). These generalize differential equations ($\sigma = \mathrm{id}$) and difference equations ($\partial = 0$). The Galois groups of these equations are no longer affine group schemes, but *quantum groups*.

After a short introduction to the Picard-Vessiot theories for differential and difference equations, we motivate the study of more general types of equations first by an example and then explain a general framework to study such equations.

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