The dual descriptions of the Askey-Wilson algebra

\[ AW(n) \]

Julien Gaboriaud *

julien.gaboriaud@umontreal.ca

The Askey–Wilson algebra \( AW(3) \) first appeared as the algebra encoding the bispectrality of the eponym polynomials. Later, it has also been described as the commutant of the \( U_q(\mathfrak{su}(1, 1)) \) algebra in its threefold tensor product. This new description has been generalized to the \( n \)-fold tensor product to define a higher rank analog of the algebra, \( AW(n) \).

I will present a description of the Askey–Wilson algebra \( AW(3) \) that is dual (in the sense of Howe) to the \( U_q(\mathfrak{su}(1, 1)) \) one. \( AW(3) \) will be obtained as a commutant of the \( \mathfrak{o}_{q^{1/2}}(2) \oplus \mathfrak{o}_{q^{1/2}}(2) \oplus \mathfrak{o}_{q^{1/2}}(2) \) algebra in \( q \)-oscillator representations of \( \mathfrak{o}_{q^{1/2}}(6) \). It will be shown that this construction is related to the dual pair \( U_q(\mathfrak{su}(1, 1)) \times \mathfrak{o}_{q^{1/2}}(6) \).

Owing to the fact that \( U_q(\mathfrak{su}(1, 1)) \times \mathfrak{o}_{q^{1/2}}(2n) \) is the more general dual pair, the construction will be extended to obtain a description of the arbitrary rank Askey–Wilson algebra \( AW(n) \) as a commutant of \( \mathfrak{o}_{q^{1/2}}(2)^{\otimes n} \) in \( q \)-oscillator representations of \( \mathfrak{o}_{q^{1/2}}(2n) \).

This is joint work with Luc Frappat (Annecy), Eric Ragoucy (Annecy) and Luc Vinet (CRM).

*Département de Physique, Université de Montréal, C.P. 6128, succ. Centre-ville, Montréal, QC H3C 3J7, CANADA