

# New approaches for numerical techniques in higher order calculations

*Thursday, 8 September 2011 10:50 (40 minutes)*

It has become customary to think of higher order calculations as analytic, in the sense that the result should be presented in the form of known functions or constants. If such a result is obtained, numerical evaluation for practical applications or expansion in asymptotic regimes should not pose any problem. There are, however, many problems of interest, where the analytic structure, due to the number of involved variables, does not make it possible to express predictions through known functions. One strategy is to extend the class of functions, as for example in the case of harmonic and generalized harmonic polylogarithms. On the other hand, if the aim is to provide results quickly and with moderate effort, then there are much more efficient approaches, which involve numerical methods at earlier stages of the calculation. In this talk, I will review methods for the evaluation of virtual corrections, such as contour deformation in Feynman-parametric and Mellin-Barnes representations, as well as the method of differential equations. Subsequently, I will present recent advances in the calculation of real radiation contributions with non-analytic evaluation of integrals over the unresolved phase space.

**Primary author:** Prof. CZAKON, Michal (RWTH Aachen)

**Presenter:** Prof. CZAKON, Michal (RWTH Aachen)

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