

**Markus Hansen**

*ETH Zürich, Switzerland*

**Analytic regularity and nonlinear approximation  
of a class of parametric semilinear elliptic PDEs**

We are interested in approximately solving a class of semilinear, parametric elliptic PDEs with affine dependence of the principal part of the differential operator. In modelling this as the problem depending on a countable number of parameters, we eventually overcome the curse of dimension in the following sense: We establish summability results of coefficient sequences of polynomial chaos type expansions of the parametric solutions in terms of tensorized Taylor-, Legendre- and Chebyshev polynomials on the infinite-dimensional parameter domain. From this we deduce rates of convergence for N-term truncated approximations of expansions of the parametric solution, the rate (and also all constants involved) not depending on the number of parameters. The argument is essentially based on extending the real parameter problem to complex parameters and establishing analytic dependence of the parametric solution on the parameters.