Complex and real Hessian equations

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The k-Hessian operator (respectively the complex k-Hessian operator) is defined pointwise as the k-th elementary symmetric polynomial of the eigenvalues of the (complex) Hessian of a given real valued function. The corresponding equations are fully nonlinear if $k > 1$ and hence one restricts the action of these operators to subclasses of functions where the equations become elliptic. In the talk we shall sketch the basic results connected with these equations and the corresponding nonlinear potential theories.

In the real case there are many contributions by Trudinger, Wang, Urbas and others. The complex setting is much less studied. Some of the results come from a joint work with S. Kołodziej.