Material parameter identification in piezoelectricity

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Electromechanical transducers made of piezoelectric materials have a wide range of application in science and industry. For their simulation via a model consisting of a coupled system of PDEs, the material parameters - appearing as coefficients in these PDEs - have to be determined.
Here, we will adress several aspects within this task of material parameter identification, especially in the situation of nonlinear behaviour as encountered at large excitation. The question of identifiability will be discussed, and a numerical identification scheme based on a multiharmonic formulation will be proposed. Finally, we present numerical results both from synthetic and from measured data.