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47876. *An Algebraic Approach to the Initial Weight Problem for Complex-Valued Polynomial
Neural Networks*. Preliminary report.

The application of Newton's method to the backpropagation training algorithm for complex-valued neural networks (CVNNs) faces distinct difficulties. In particular, the choice of the initial iterates when applying Newton's method to the minimization of any function on a complex domain is a well-known problem. When Newton's method is applied to training CVNNs, this becomes the problem of choosing initial weights that guarantee minimization of the error function. We propose the use of polynomials as activation functions for CVNNs, thus allowing us to take an algebraic approach to the initial weight problem. In this talk, we investigate the application of an algebraic root-finding technique to the case of polynomial CVNNs to develop a theoretical algorithm for the location of initial weight vectors that will guarantee successful training. (Received September 16, 2014)