

SOLVING NONLINEAR EQUATIONS USING HERMITE
INTERPOLATION BY POLYNOMIAL OR RATIONAL SPLINES

P. Sablonnière

INSA & IRMAR

Rennes, France

`Paul.Sablonniere@insa-rennes.fr`

We describe some new methods for the solution of nonlinear equations in one and two variables based on Hermite interpolation by polynomial or rational splines. In the univariate case, the method is an extension of Newton and secant methods. Numerical tests show that the convergence is cubic. In the bivariate case, the solution of the system $f = g = 0$ is based on the approximation of functions f and g by convenient quadratic polynomial or rational spline approximants ϕ and ψ , followed by the solution of the system $\phi = \psi = 0$. Numerical examples will illustrate the method.