

PROPOSITION 1.2 (Examples of generally convergent algorithms).

I. *Newton's method is the unique degree 2 superconvergent algorithm for quadratics which fixes ∞ .*

II. *There exists a unique degree 4 superconvergent algorithm for cubics. If the cubic polynomial p is given by*

$$p(X) = X^3 + aX + b$$

then the algorithm is given by

$$T_p(X) = X - \frac{(X^3 + aX + b)(3aX^2 + 9bX - a^2)}{(3aX^4 + 18bX^3 - 6a^2X^2 - 6abX - 9b^2 - a^3)}.$$