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Glossary

\mathbb{C} the set of complex numbers, 32

$K(\mathbb{C})$ the set of circular disks, 32

$Z = \{c; r\}$ circular disk $= \{z \in \mathbb{C} : |z - c| \leq r\} \in K(\mathbb{C})$, 32

mid Z center of a disk Z , 32

rad Z radius of a disk Z , 32

Z^{-1} exact inverse of a disk Z , 32

Z^{I_c} centered inverse of a disk Z , 32

$Z_1 \cap Z_2$ intersection of two disks, 33

$Z_1 \subseteq Z_2$ inclusion of disks, 33

$Z^{1/2}$ square root of a disk Z , 34

I_n index set, $I_n = \{1, \dots, n\}$, 2

P monic algebraic polynomial, $P(z) = z^n + a_{n-1}z^{n-1} + \dots + a_1z + a_0$, 2

z_i approximation to the zero ζ_i of a polynomial P , 2

\hat{z}_i the next approximation to the zero ζ_i , 4

$\delta_{k,i} = P^{(k)}(z_i)/P(z_i)$ ($k = 1, 2, \dots$), 5

$\Delta_i = (P'(z_i)^2 - P(z_i)P''(z_i))/P(z_i)^2$, 163

W_i Weierstrass' correction $= P(z_i)/\prod_{j \neq i}(z_i - z_j)$, 2

N_i Newton's correction $= P(z_i)/P'(z_i)$, 8

H_i Halley's correction $= (P'(z_i)/P(z_i) - P''(z_i)/(2P'(z_i)))^{-1}$, 6

w maximal Weierstrass' correction $= \max_{1 \leq i \leq n} |W_i|$, 68

- f function whose zero ζ is sought, 35
- f^{-1} the inverse function to f , 38
- $f^{(k)}$ the k th derivative of a complex function f , 46
- $f_{(z)}^{(k)}$ the k th Fréchet derivative at the point z , 37
- ζ a zero of f , 35
- ζ_i a zero of a polynomial P , 2
- μ the multiplicity of the zero ζ of a function f , 21
- μ_i the multiplicity of the zero ζ_i of a polynomial P , 21
- $E_k(z, h, f)$ the k th incremental Euler algorithm, 49
- d minimal distance between approximations $= \min_{j \neq i} |z_i - z_j|$, 61
- c_n i -factor, $w \leq c_n d$, 69
- $z_i^{(m)}$ approximation to the zero ζ_i in the m th iteration, 71
- $u_i^{(m)}$ error in the m th iteration $= z_i^{(m)} - \zeta_i$, 97
- γ_n convergence factor, 97
- $C_i^{(m)}$ iterative correction in the m th iteration, 71
- β_n contraction factor, $|C_i^{(m+1)}| < \beta_n |C_i^{(m)}|$, 74
- \mathcal{O} same order of magnitude (of real numbers), 23
- \mathcal{O}_M same order of magnitude (of complex numbers), 135
- O_R R -order of convergence, 181
- $\rho^{(m)}$ a measure of the separation of inclusion disks generated in the m th iteration, 190
- \approx approximate equality between numbers, 7

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