Comparative cost and preferred method

For the simple-root theorem, the proved iteration count is double-logarithmic in inverse tolerance within the invariant neighbourhood. For the specified double root, ordinary Newton is only logarithmic. Modified Newton and correctly chosen gradient descent tie at one step on this quadratic. These are exact iteration counts; each method's derivative, multiplicity and step-selection costs remain explicit.

Source qualification

The source page was inspected visually (physical pp.1060–1061). Equation (33.34) omits the factor 1/2; part (b) prints $f'(\gamma^{(t)})$ and a first power of the error. The corrected theorem and the invalid assumptions are stated explicitly, not attributed as an unchanged source proof.