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| Method | Input | Iteration | Idea behind method | Required for convergence | Pros | Cons |
| Bisection | f(x), interval (a,b) | Xn+1 = midpoint of the interval where f(a)f(b) < 0. | From a starting window (a,b), continually cut the window in half retaining that f(anew)f(bnew) < 1. This will make the window smaller and zoom it in on the true root. | F(x) is continuous, f(a)f(b) < 0 | Always finds solution. | Linear of rate 0.5. |
| Fixed Point | F(x), x0 | G(x) = g(xn-1) | We find a g(r) = r from a expression f(x) = 0. Then, g(r) = r will converge on our answer using g(x) = x + c\*f(x) as long as the neighborhood of the solution has derivative less than 1. | G’(x) < 1 near x\*, x0 near x. | At least linear | Can diverge for some functions. |
| Newton | F(x), x0 |  | We use the slope around each guess to find the next point, which can be faster | F(X) is twice differentiable, x0 near root | Quadratic once it is in neighborhood of root | Can move randomly until it gets near root. |
| Secant | F(x), x0 |  | Similar to Newton, but we don’t need to find derivative of f(x) | Same as Newton | Rate of convergence is ~1.61, doesn’t need derivative | Not as fast as Newton |