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```matlab
% b. f(x) = x^2 # 3x + 1 = 0

% function call
bisect()
fptr()
newton()
```
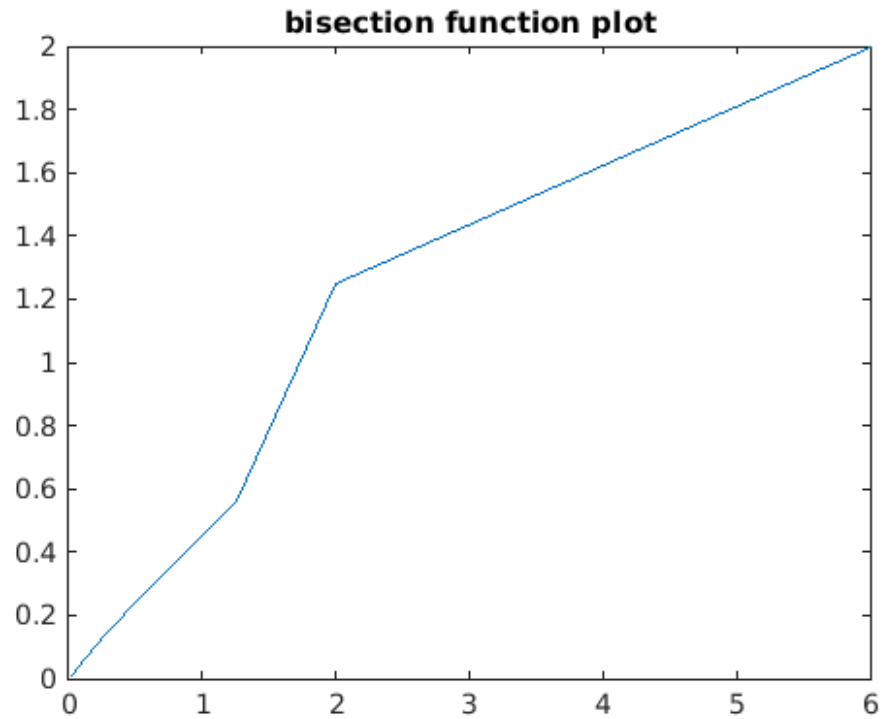
bisection function

```matlab
function bisect()
    x1 = 2.0;
    x2 = 4.0;
    f1 = find(1, x1);
    f2 = find(1, x2);
    max_itr = 50;
    tol = 10^ - 6;
    if (f1*f2 > 0)
        fprintf("INVALID!");
    end
    err = zeros(1, max_itr);
    for itr = 1 : 1 : max_itr
        m = (x1 + x2)/2;
        fm = find(1, m);
        err(itr) = abs(f2 - f1);
        if (err(itr) < tol)
            break
        end
        if(f1*fm > 0)
            x1 = m;
            f1 = fm;
        else
            x2 = m;
            f2 = fm;
        end
    end
    m
    figure(1)
    plot(err(1 : itr - 1), err(2 : itr))
    title('bisection function plot')
end
```
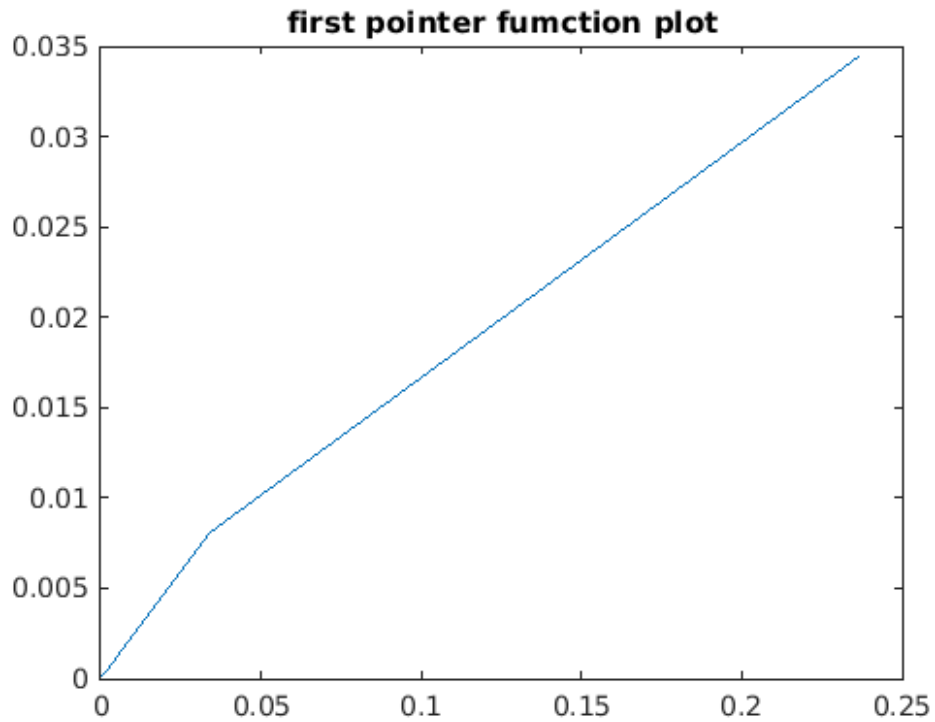
bisection function plot

iterator (first pointer)

```matlab
function fptr()
    x = 0.1;
    xold = x;
    max_itr = 50;
    errfp = zeros(1, max_itr);
    tol = 10^ - 6;
    for itr = 1 : 1 : max_itr
        x = find(2, xold);
        errfp(itr) = abs(x - xold);
        xold = x;
        if errfp(itr) < tol
            break
        end
    end
    x
    figure(2)
    plot(errfp(1 : itr - 1), errfp(2 : itr))
    title('first pointer fumction plot')
end


x =

    0.3820
```

first pointer fumction plot

newton function

```
function newton()
    x = 4;
    max_itr = 50;
    errnt = zeros(1, max_itr);
    tol = 10^ - 6;
    for itr = 1 : 1 : max_itr
        fx = find(1, x);
        dfx = find(3, x);
        xnew = x - fx/dfx;
        errnt(itr) = abs(xnew - x);
        if(errnt(itr) < tol)
            break
        end
        x = xnew;
    end
    xnew
    figure(3)
    plot(errnt(1 : itr - 1), errnt(2 : itr))
    title('newton function plot')
end
```

finder function

```
function fval = find(arg,xval)
    if arg == 1
```

```
        fval = xval^2 - 3*xval + 1;
    elseif arg == 2
        fval = (xval^2 + 1)/3;
    else
        fval = 2*xval - 3;
    end
end
```

m =

    2.6180

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