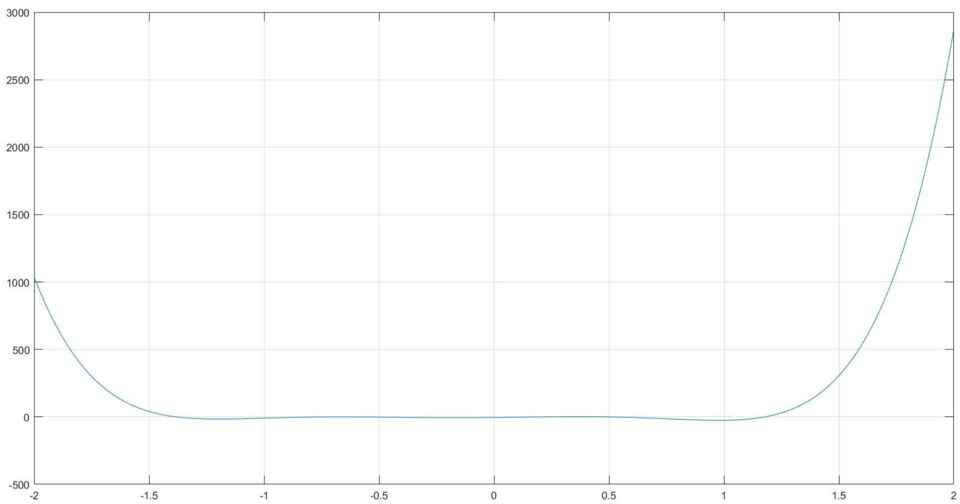
1. 设$f(x)=54x^6+45x^5-102x^4-69x^3+16x-4$.画出在区间$[-2,2]$上的函数图形，并且用割线法求在区间内的所有5个根.对哪一个根是线性收敛？对哪一个根是超线性收敛？

解：使用Matlab绘图，$y=f(x)$的函数图形如下：



由图可看出，该函数在$[-1.40,-1.38]$、$[-0.70,-0.65]$、$[0.19,0.21]$、$[0.42,0.56]$、$[1.14,1.25]$各有一个根. 根据割线方法，将区间的端点值作为初始估计的x_0、x_1，应用下式

$$x_{i+1}=x_i-\frac{f(x_i)(xi-x_{i-1})}{f(x_i)-f(x_{i-1})}$$

迭代结果如下。

区间$[-1.40,-1.38]$，初始估计$x_0=-1.40$，$x_1=-1.38$，根为$r_1=-1.381298482043995$，根据近似误差关系可知r_1为超线性收敛；

i	x_i	i	x_i
0	-1.400000000000000	5	-1.381298482043994
1	-1.380000000000000	6	-1.381298482043995
2	-1.381197644126780	7	-1.381298482043995
3	-1.381299053994796		
4	-1.381298481792954		

区间$[-0.70,-0.65]$，初始估计$x_0=-0.70$，$x_1=-0.65$，根为$r_2=-0.666666668223303$，根据近似误差关系可知r_2为线性收敛；

i	x_i	i	x_i
0	-0.700000000000000	5	-0.662087104612204
1	-0.650000000000000	6	-0.663762325233371
2	-0.634513327381772	7	-0.664893121041524
3	-0.655843305543274	......	
4	-0.658651749173768	39	-0.666666668223303

区间$[0.19, 0.21]$，初始估计$x_0 = 0.19$，$x_1 = 0.21$，根为$r_3 = 0.205182924689048$，根据近似误差关系可知$r_3为超线性收敛；

i	x_i	i	x_i
0	0.190000000000000	5	0.205182924689048
1	0.210000000000000	6	0.205182924689048
2	0.205285933196013	7	0.205182924689048
3	0.205182159523654		
4	0.205182924807156		

区间$[0.42, 0.56]$，初始估计$x_0 = 0.42$，$x_1 = 0.56$，根为$r_4 = 0.500000000000000$，根据近似误差关系可知r_4为超线性收敛；

i	x_i	i	x_i
0	0.420000000000000	5	0.499991193994376
1	0.560000000000000	6	0.499999983425379
2	0.478669736153616	7	0.500000000000607
3	0.495405541797457	8	0.500000000000000
4	0.500453381095937	9	0.500000000000000

区间$[1.14, 1.25]$，初始估计$x_0 = 1.14$，$x_1 = 1.25$，根为$r_5 = 1.176115557354947$，根据近似误差关系可知r_5为超线性收敛。

i	x_i	i	x_i
0	1.140000000000000	5	1.176114634308360
1	1.250000000000000	6	1.176115557004612
2	1.166523353348901	7	1.176115557354948
3	1.173698190128100	8	1.176115557354947
4	1.176210815130013	9	1.176115557354947