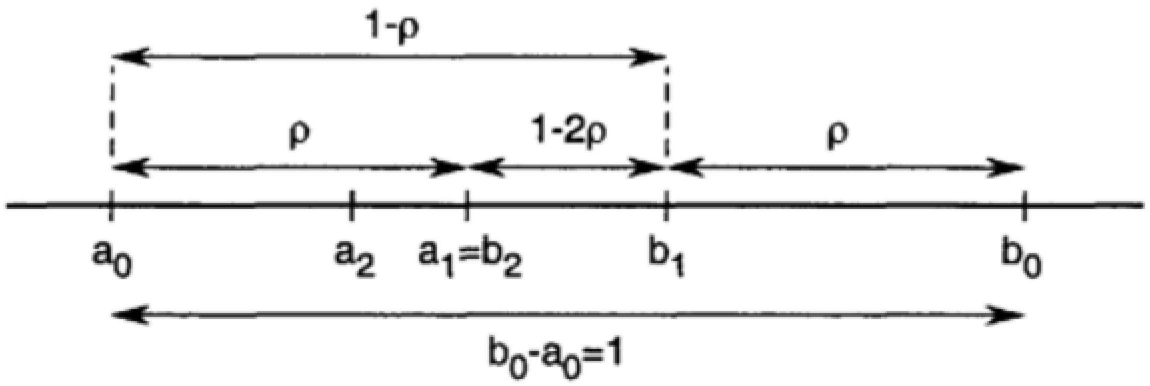
1.

For golden section method： gs.m

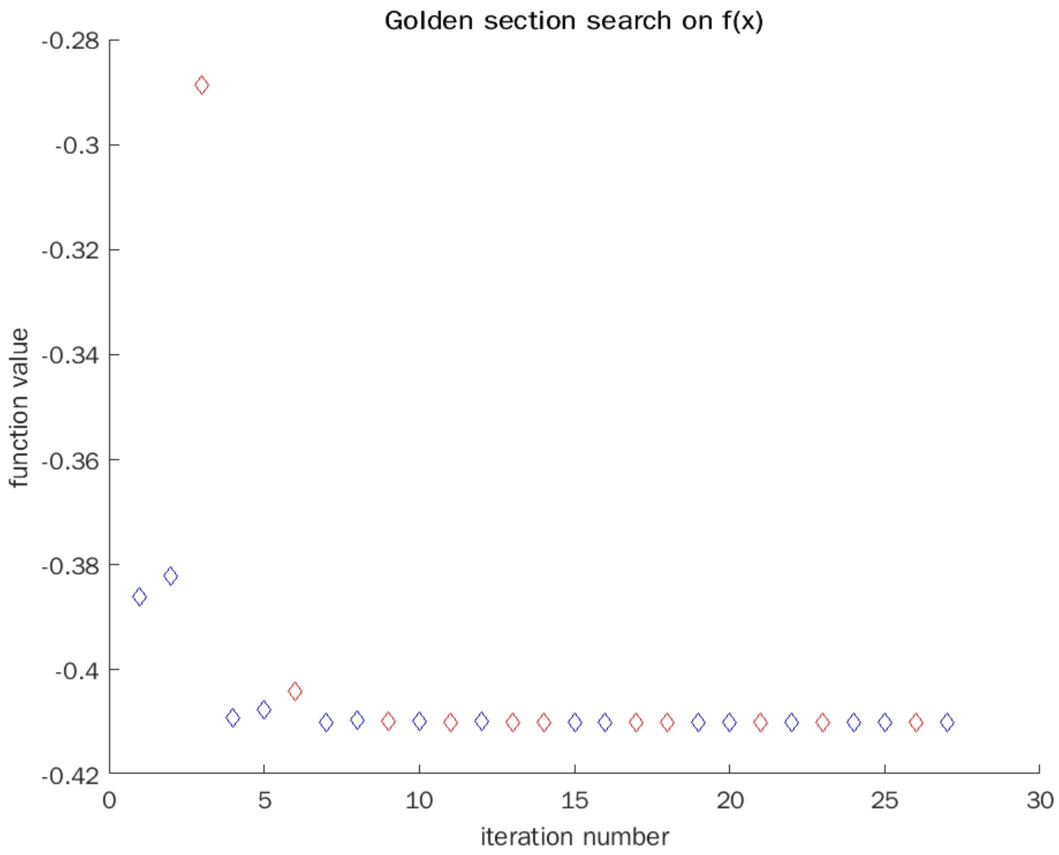
Method：

$$a_1 = a_0 + \varphi(b_0 - a_0)$$
$$b_1 = a_0 + (1-\varphi)(b_0 - a_0)$$
$$\varphi = \frac{3-\sqrt{5}}{2}$$

若最小化後的值比前一次小，則調整區間至$[a_0, b_1]$
若最小化後的值比前一次大，則調整區間至$[a_1, b_0]$



Result：



1.

For fibonacci method： Fib.m, fibonacci.m

Method：

Initialize the Fibonacci sequence $F_0 = F_1 = 1$

while $F_n \leq (b-a)/\varepsilon$ **do**

  Calculate Fibonacci numbers $F_n = F_{n-1} + F_{n-2}$

end while

$d = b - a$

for k=1:n **do**

  $d \leftarrow d \times F_{n-k}/F_{n-k+1}$

  $x_1 \leftarrow b - d$

  $x_2 \leftarrow a + d$

  if $f(x_1) \leq f(x_2)$ **then**

    $b \leftarrow x_2$

  else

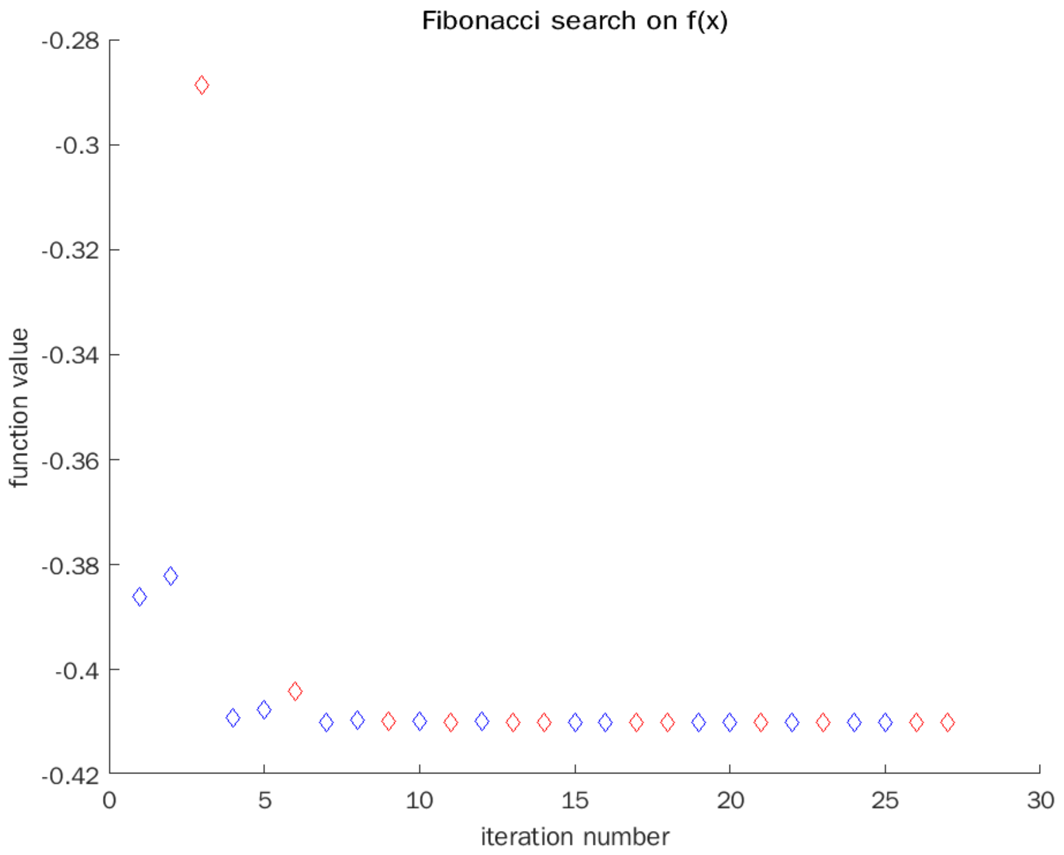
    $a \leftarrow x_1$

  end if

end for

若最小化後的值比前一次小，則調整區間至$[a_0, b_1]$
若最小化後的值比前一次大，則調整區間至$[a_1, b_0]$

Result：



2.

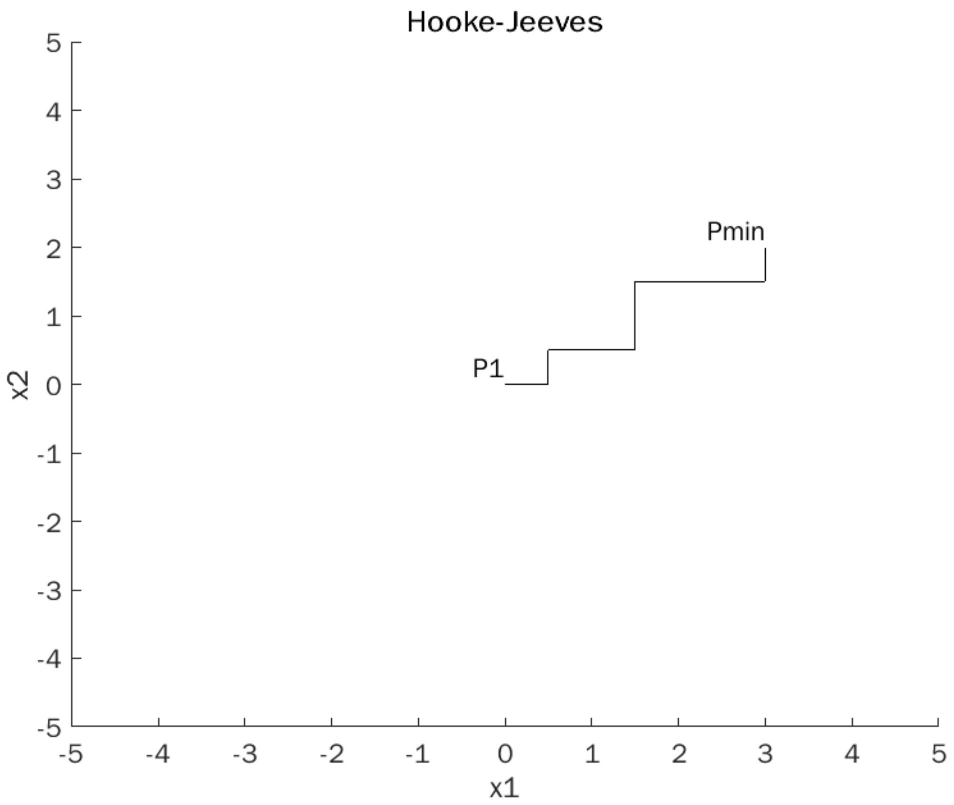
For hooke method： Hooke.m

Method：參考 http://www.netlib.org/opt/hooke.c

Exploratory move

- Current solution is x^c; set i = 1; $x = x^c$
- S1: $f = f(x)$, $f^+ = f(x_i + \Delta_i)$, $f^- = f(x_i - \Delta_i)$
- S2: $f_{min} = \min(f, f^+, f^-)$; set x corresponding to f_{min}
- S3: If i = N, go to 4; else i = i + 1, go to 1
- S4: If $x \neq x^c$, success, else failure

Result：



3.
For Powell’s conjugate method： Powells.m, backtr.m

Method：參考 https://t.co/nd2illLXfn , https://t.co/3esqrvXVDb

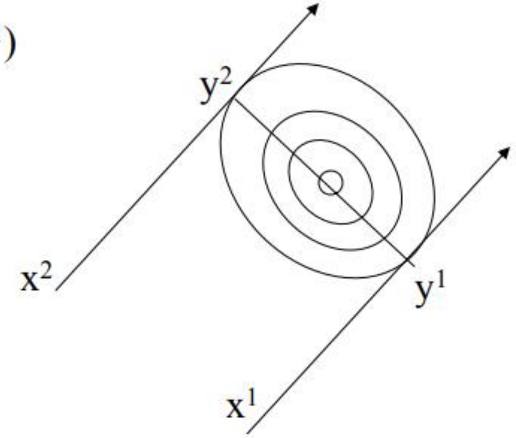
For a quadratic function IN 2 VARIABLES

- TAKE 2 POINTS x^1 & x^2 AND
- A DIRECTION ‘d’

IF y^1 IS A SOLUTION OF MIN $f(x^1+\lambda d)$ &
y^2 IS A SOLUTION OF MIN $f(x^2+\lambda d)$

THEN $(y^2- y^1)$ IS CONJUGATE TO d

OPTIMUM LIES ALONG $(y^2- y^1)$



Result：