1.要将函数$f(x_1,x_2)=6x_1^2-6x_1x_2+2x_2^2-x_1-2x_2$转换为 $f=B^TX+\frac{1}{2}X^TAX$的形式

其中其中 $X=[x1x2]^T$且 A要对角化。还要画出A的等高线图像,在这个基础上还有SQP考察

2.泰勒展开，P17 这个是一元是，最好把二元的也学习一下

FIGURE 1.12
Concept of derivative.

In most optimization problems, which are generally nonlinear, $f'(x)$ has to be evaluated numerically. We can use *forward difference*, *backward difference*, and *central difference* methods to find the derivative of a function at a point. If the value of a function $f(x)$ is known at a point x, then the value of the function at its neighboring point $x + \Delta x$ can be computed using *Taylor's series* as

$$f(x+\Delta x)=f(x)+\Delta x f'(x)+\frac{\Delta x^2}{2!}f''(x)+\frac{\Delta x^3}{3!}f'''(x)+\cdots \tag{1.36}$$

Rearranging Equation 1.36 gives

$$\frac{f(x+\Delta x)-f(x)}{\Delta x}=f'(x)+\frac{\Delta x}{2!}f''(x)+\frac{\Delta x^2}{3!}f'''(x)+\cdots \tag{1.37}$$

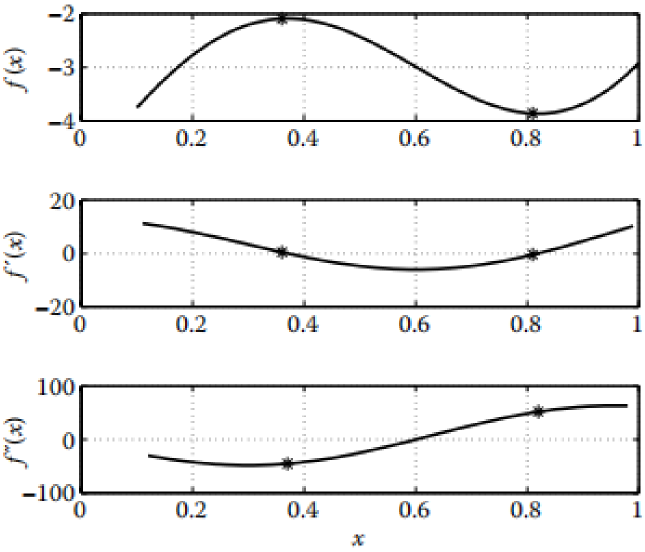
The *forward difference* formula for evaluating the derivative of a function can be written as

$$f'(x)=\frac{f(x+\Delta x)-f(x)}{\Delta x}+O(\Delta x) \tag{1.38}$$

The quantity $O(\Delta x)$ represents that this formula is first-order accurate. In a similar fashion, the *backward difference* formula can be written as

$$f'(x)=\frac{f(x)-f(x-\Delta x)}{\Delta x}+O(\Delta x) \tag{1.39}$$

3.Optimization_ Algorithms and Application_.P18



4.HESSION矩阵，雅可比矩阵P19-21 P22的例子 P24,25

20. Find the directional derivative of the function

$$f(\boldsymbol{x}) = x_1^2 x_2 + x_2^2 x_3 - x_1 x_2 x_3^2$$

5.

at (1, 1, −1) in the direction $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$.

5.bisection P39

6.牛顿法P42   考P65

7.Cubic P44   2.3.4

8. 遗传算法和PSOP159
9. 加权和法Algorithms-for-optimization第12章内容，加权最小-最大法
10. 高斯分布Algorithms-for-optimization 第15章内容15.1 15.3