

Example This could be solved by Sec 23 method of straight substitution of constraint into $f(x,y)$.

But easy examples illustrate Lagrange method " "

Maximize $f(x,y) = x^2 + 3y^2$ subject to $x+y = -1$

Book

Rewrite constraint in form $g(x,y) = 0$:

$$x+y+1=0$$

Build fcn $F(x,y,\lambda)$ from f and g :

$$\begin{aligned} F(x,y,\lambda) &= f(x,y) + \lambda g(x,y) \\ &= x^2 + 3y^2 + \lambda(x+y+1) \\ &= x^2 + 3y^2 + \lambda x + \lambda y + \lambda \end{aligned}$$

Video

Keep $x+y = -1$ as is, calling the left side $g(x,y)$ and the right side c .

$$\text{So } g(x,y) = c$$

$$\text{or } \underbrace{x+y}_{g} = \underbrace{-1}_{c}$$

No need to write a new fcn F .