

## Step-1

Let if possible, both the alternatives hold for some  $A$  and  $b$ . Thus, we have:  $Ax \geq b$  has a nonnegative solution  $x$  and there exists a vector  $y$ , such that  $yA \geq 0$  and  $yb < 0$ .

Consider,  $yAx \geq yb$ .

Since  $yb < 0$ , it is clear that  $yAx < 0$ .

But we have assumed that  $yA \geq 0$  and  $x$  is a nonnegative vector.

Therefore,  $yAx \geq 0$ .

## Step-2

Thus, we have  $yAx < 0$  as well as  $yAx \geq 0$ . This is contradiction. Thus, our assumption that both the alternatives can hold simultaneously is wrong. This shows that both the alternatives do not hold simultaneously.