

Sequence 1 : Introduction to mathematical programming using GAMS

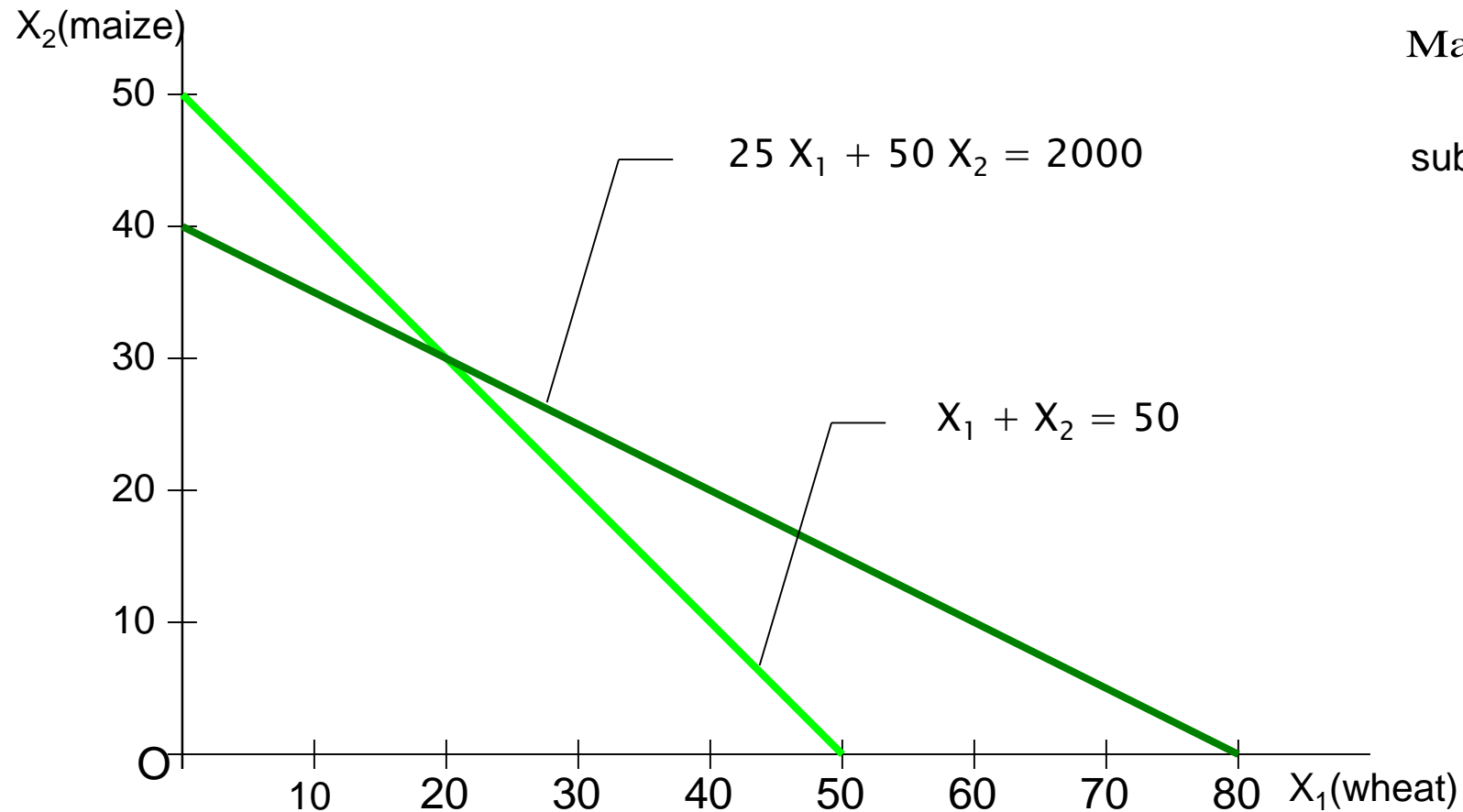
Unit 1.1 : Constrained optimization

Lesson 2 : Its graphic resolution

Florence Jacquet

ModelEco

Graphic representation



Maximiser $Z = 450 X_1 + 1000 X_2$

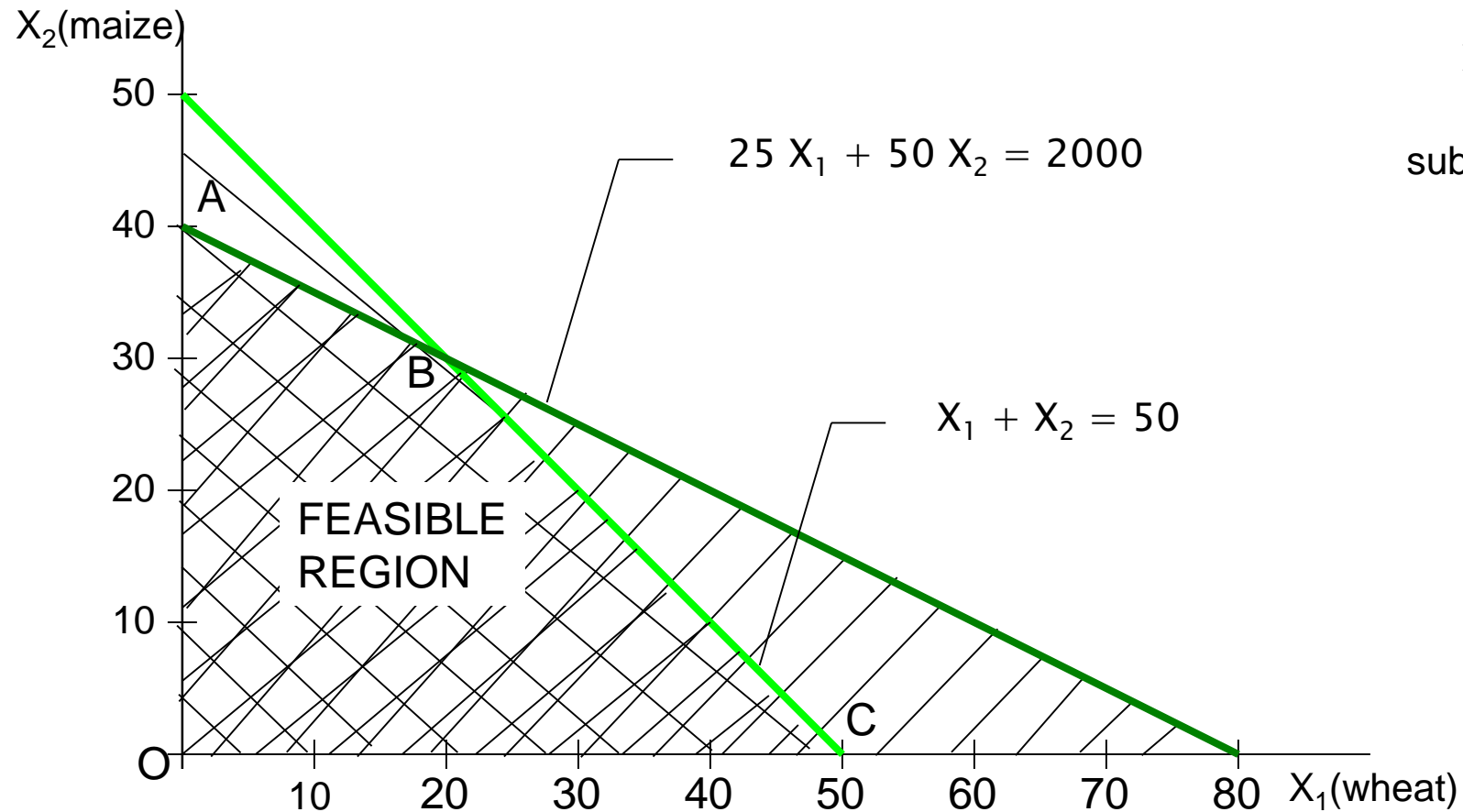
subject to $X_1 + X_2 \leq 50$

$25 X_1 + 50 X_2 \leq 2000$

$X_1 \geq 0 ; X_2 \geq 0$

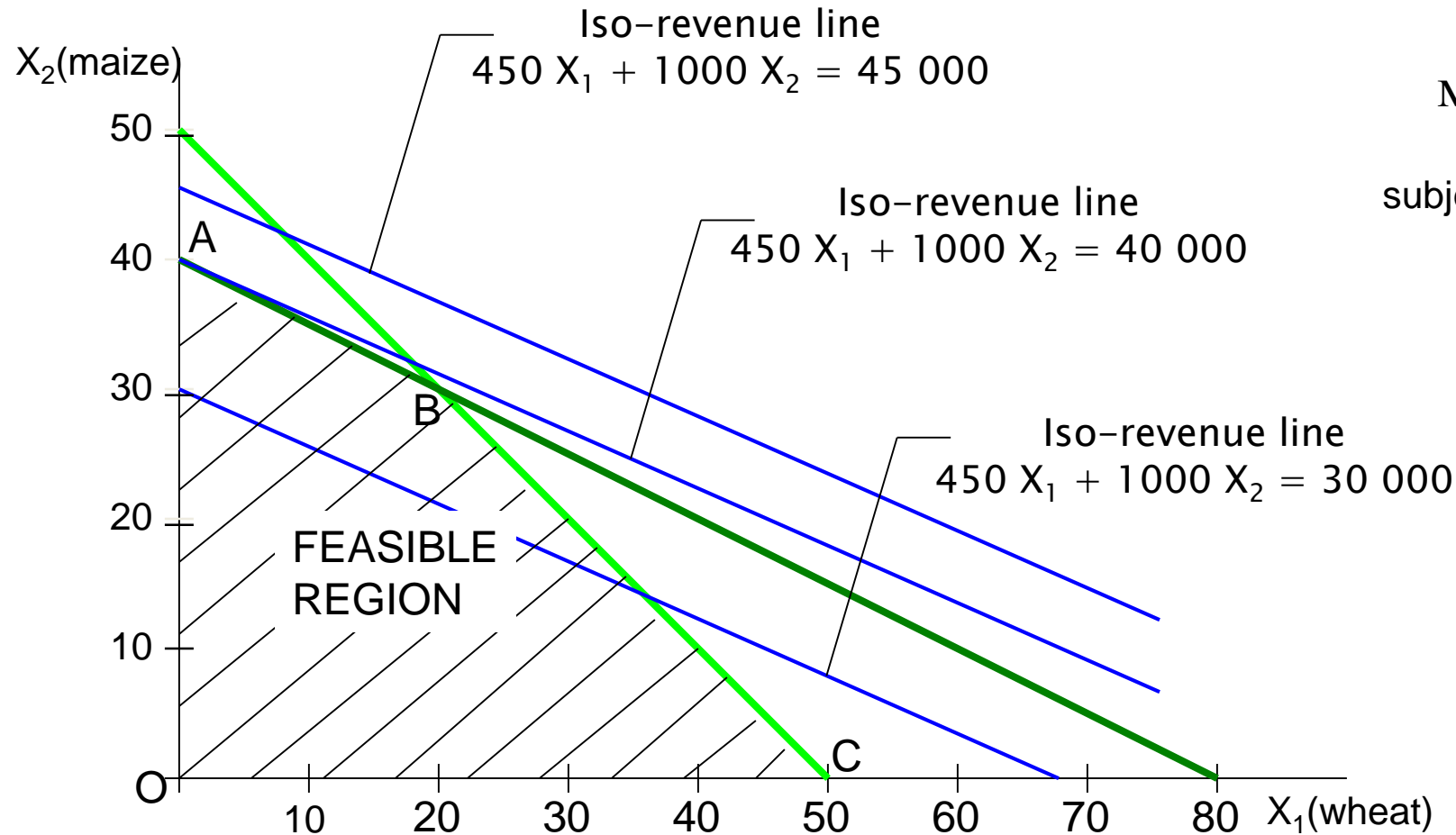
What is the solution :
A, B, C or O ?

Feasible region



$$\begin{aligned} &\text{Max} && Z = 450 X_1 + 1000 X_2 \\ &\text{subject to} && X_1 + X_2 \leq 50 \\ &&& 25 X_1 + 50 X_2 \leq 2000 \\ &&& X_1 \geq 0 ; X_2 \geq 0 \end{aligned}$$

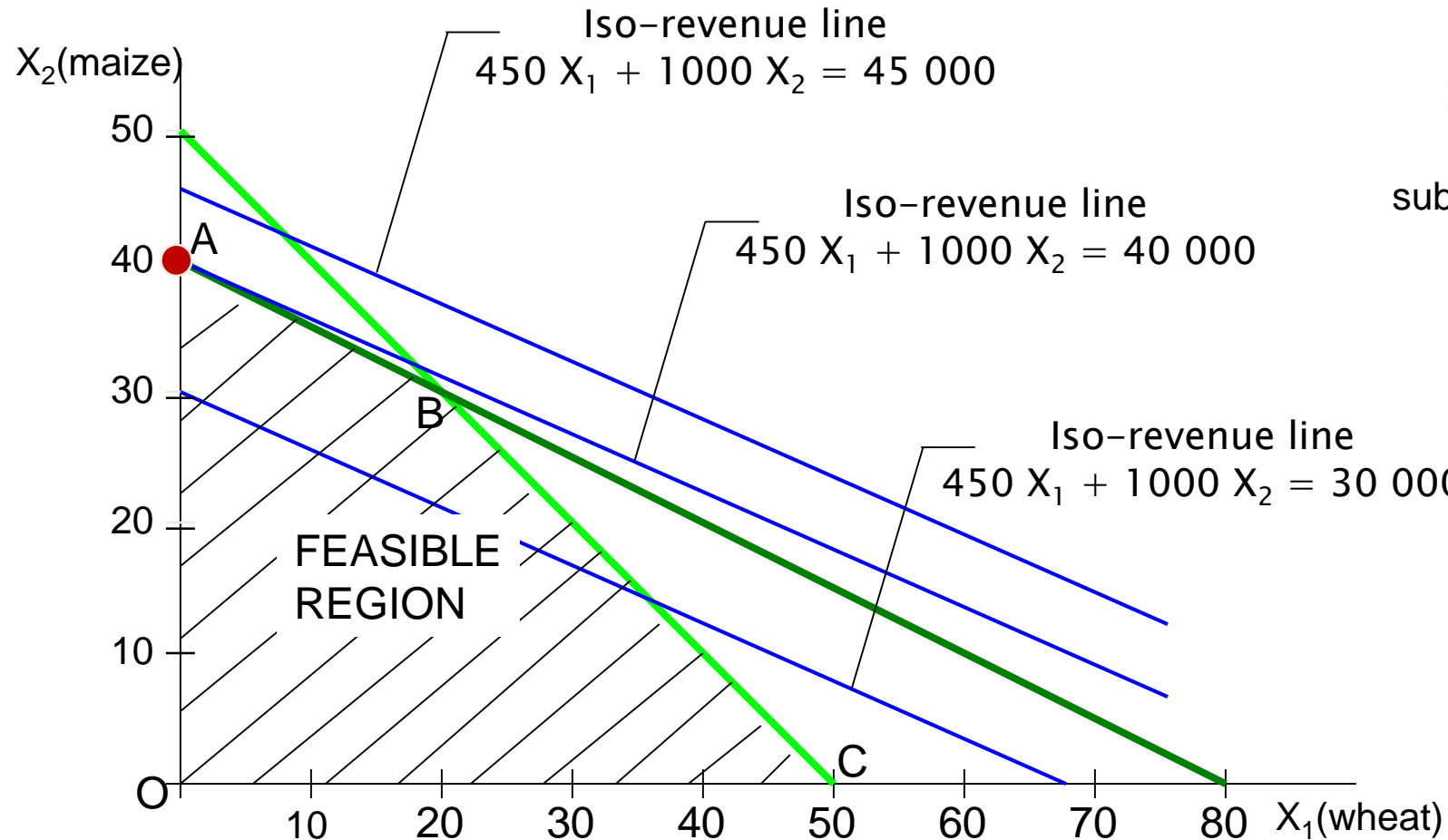
Iso-income lines



$$\begin{aligned} & \text{Max} && Z = 450 X_1 + 1000 X_2 \\ & \text{subject to} && X_1 + X_2 \leq 50 \\ & && 25 X_1 + 50 X_2 \leq 2000 \\ & && X_1 \geq 0 ; X_2 \geq 0 \end{aligned}$$

Solution : point A $\left\{ \begin{array}{l} X_1 = 0 \\ X_2 = 40 \\ Z = 40000 \end{array} \right.$

Solution



$$\begin{array}{ll} \text{Max} & Z = 450 X_1 + 1000 X_2 \\ \text{subject to} & X_1 + X_2 \leq 50 \\ & 25 X_1 + 50 X_2 \leq 2000 \\ & X_1 \geq 0 ; X_2 \geq 0 \end{array}$$