University Aboubekr Belkaïd of Tlemcen
Faculty of Sciences
Department of Mathematics
Academic year 2019/2020
Master 1

Correction model of the Final Exam : Scientific English 2
September 29th
Duration : 1 hour

Exercise 1 : [**5.5/10**]

1) Translate from French to English what follows :

D'après les hypothèses, chaque ligne verticale $\{x \times \mathrm{R}\}$ rencontre l'ensemble $\mu = M^{-1}(0)$ exactement une fois si x est compris entre 0 et a, et pas du tout si x est plus grand que a. (...) D'après le théorème des fonctions implicites, μ est le graphe d'une application C^1 positive ou nulle.

2) What are, in English (literally and not only symbolically) the logical connectives and the quantifiers ?

Answer :

1) According to the assumptions (*hypotheses*), each vertical line $\{x \times \mathrm{R}\}$ meets the set $\mu = M^{-1}(0)$ exactly once if x is between 0 and a, and not at all if x is greater than a. (...) According to (*By*) the Implicit Function Theorem, μ is the graph of a nonnegative C^1 map.

2) The logical connectives : Conjunction ('and',$\wedge$)- Disjunction ('or',$\vee$)- Implication ('implies',$\Rightarrow$)- Equivalence ('is equivalent to', $\Leftrightarrow$)- Negation ('not',$\neg$).

The quantifiers : The existential quantifier ('there exists at least', $\exists$)- The universal quantifier ('for any',$\forall$).

Exercise 2 : [**4.5/10**]

1) Translate from English to French what follows :

Theorem : Under the assumptions (1) to (8), the Kolmogorov's model (K) is a prey-predator one, and three issues are possible :

First, (K) has an asymptotically stable node.

Secondly, (K) has an asymptotically stable focus.

Thirdly, (K) has a stable limit cycle.

2) What is a limit cycle for a continuous dynamical system ?

Answer :

1) Sous les hypothèses (1) à (8), le modèle de Kolmogorov (K) est un *modèle* proie-prédateur, et trois "issues" sont possibles :

Premièrement, (K) admet (*a*) un noeud asymptotiquement stable.

Deuxièmement, (K) admet (*a*) un foyer asymptotiquement stable.

Troisièmement, (K) admet (*a*) un cycle limite stable.

2) For a continuous dynamical system, a limit cycle is an isolated and closed (*periodic*) orbit.

Quotation

"Every mathematician believes that he is ahead of the others. The reason none state this belief in public is because they are intelligent people."

- A. N. Kolmogorov -