TỔNG LIÊN ĐOÀN LAO ĐỘNG VIỆT NAM

**TRƯỜNG ĐẠI HỌC TÔN ĐỨC THẮNG**

**KHOA CÔNG NGHỆ THÔNG TIN**



**LÊ NGUYỄN CAO DUY – 523H0018**

**NGÔ CHÍ THUẬN – 523H0102**

**TÊN ĐỀ TÀI**

**FINAL REPORT**

**NHẬP MÔN  
XỬ LÝ NGÔN NGỮ TỰ NHIÊN**

**THÀNH PHỐ HỒ CHÍ MINH, NĂM …**

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Instructor

**Master. Pham Kim Thuy**

**HO CHI MINH CITY, 2024**

**THANK YOU**

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*Ho Chi Minh city, 7th January, 2024*

*Authors*

*(Sign and clearly write your full name)*

***Le Nguyen Cao Duy***

***Ngo Chi Thuan***

**THIS PROJECT IS COMPLETED**

**AT TON DUC THANG UNIVERSITY**

I hereby declare that this research work is my own, conducted under the scientific guidance of Master. Pham Kim Thuy. The content and results presented in this thesis are truthful and have not been published in any form prior to this. The data in the tables, serving for analysis, comments, and evaluations, were collected by the author from various sources, as clearly stated in the reference section.

Additionally, in this project, certain comments, evaluations, and data from other authors or organizations are used, and proper citations and references are provided to acknowledge the sources.

**If any form of misconduct is detected, I take full responsibility for the content of my project**. Ton Duc Thang University is not implicated in any copyright violations or infringements caused by me during the course of this work (if any).

*Ho Chi Minh city, 7th January, 2024*

*Authors*

*(Sign and clearly write your full name)*

***Le Nguyen Cao Duy***

***Ngo Chi Thuan***

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# DANH MỤC CÁC CHỮ VIẾT TẮT

|  |  |
| --- | --- |
| BERT | Bidirectional Encoder Representations from Transformers |
| GEC | Grammatical Error Correction |
| MLM | Masked Language Model |
| NLP | Natural Language Processing |
| NSP | Next Sentence Prediction |

# CƠ SỞ LÝ THUYẾT

## Even And Odd Functions

* Even functions:

Let be a real-valued function of a real variable. Then is even if the following equation hold for all such that and are in the domain of .

Or equivalently if the following equation holds for all such :

Geometrically, the graph of an even function is symmetric with respect to the y-axis, meaning that its graph remains unchanged after reflection about the y-axis.

* Odd functions:

Let be a real-valued function of a real variable. Then is odd if the following equation hold for all such that and are in the domain of .

Or equivalently if the following equation holds for all such :

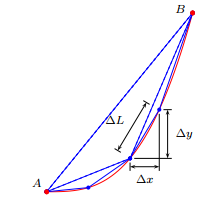
## Differrentiation Formulas

Let and be differentiable functions. What is ?

Suppose

## The Arc Length

A function called smooth if is continuous.

* How to measure the arc length of a smooth curve?
* The arc length of curve from to is

## The Substitution Rule

* The Substitution Rule (For indefinite integral)

Let be a differentiable function whose range is an interval

* + If is continuous on , and is continuous,
  + Then
* Remake The conditions are just to make sure that the function to be integrated is continuous on an interval.
* Proof Diferentiate the right side with the respect to x.

## First Derivative Test

Let be continuous and a critical number of

* If changes from positive to negative at then has a local maximum at .
* If changes from negative to positive at then has a local minimum at .
* If does not change sign at , then has no local max/min at .

## The Ratio Test

* Theorem:

Suppose , where .

## The Comparison Test

* Theorem
* for all n

# TÀI LIỆU THAM KHẢO

Tiếng Việt

…

Tiếng Anh

﻿[1]. Maurice D. Weir, Joel Hass, George B. Thomas, [2010], Thomas' calculus, Pearson Education, Boston.

﻿[2]. R. L. Burden, J. D. Faires, [2011], Numerical Analysis, 9th edition, Brooks/Cole, Boston

[3]. James Stewart, [2012], Calculus, Brooks/Cole, Belmont.

﻿[4]. R. W. Hamming, [1986], Numerical methods for scientists and engineers, Dover, New York.

[5]. Steven C. Chapra, [2012], Applied numerical methods with MATLAB for engineers and scientists, McGraw-Hill Education, New York.

[6]. Timothy A. Davis, [2011], MATLAB primer, CRC Press, Boca Raton.

1.Tell whether the following functions are even, odd, or neither. Give reasons for your answer.

*Solving*

Replace with :

Replace with :

We have:

Function is neither

Replace with :

Replace with :

We have:

Function is odd

Replace with :

Replace with :

Function is even

Replace with :

Replace with :

We have:

Function is odd

2. Find the following limit as:

*Solving*

3. Find the derivatives of the following functions:

*Solving*

=

:

Let

Derivative of u with respect to x:

=

From = the equation becomes:

4. Find an equation of the tangent line to the graph of at the point where .

*Solving*

We have:

Call

Equation of the tangent line to the graph of of the form:

5. Given the derivative .

* What are the critical numbers of ?
* On what open intervals is increasing or decreasing?
* At what points, if any, does assume local maximum and minimum value?

*Solving*

* What are the critical numbers of ?

Set equal to zero:

= 0

From (1) we have:

From (2) we have:

* On what open intervals is increasing or decreasing?

increase from and .

decrease from

* At what point, if any, does assume local maximum and minimum value?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
|  | - | 0 + | 0 - | 0 + | 0 - |  |
|  |  |  |  |  |  |  |

Picture1.1:Table of variation

Expression equivalence:

We have:

Substitute into equation

Substitute into equation

Substitute into equation

Function assume local maximum at

Function assume local maximum at .

6. Find all curves though a point where whose are length is the following value:

*Solving*

The arc length of the curve from to is:

Check if :

Check if :

Conclusion:

All curves though a point where are and

7. Given that are real numbers fulfilling the following conditions:

Determine the convergence or divergence of the following series. Explain in details.

We will call the series:

Using the Direct Comparison test:

8. Find all values of such that the following series is absolutely convergent:

*Solving*

We have:

The series above is absolutely convergent, then

Using the Ratio Test we have:

*L’H:*

Conclusion:

9. One thousand earphones sell for $55 each, resulting in a revenue of (1000) ($55) = $55,000. For each $5 increase in the price, 20 fewer earphones are sold. For example, if the price of each earphone is $60, there will be 980 (1000-20) earphones sold; if the price of each earphone is $65, there will be 960 (1000-40) earphones sold; so on. Find the revenue in case the price of each earphone is $225.

*Solving*

Define:

as the price of each earphone.

as the quantity of earphones sold.

Given that for each $5 increase in price, 20 fewer earphones are sold, we can express the relationship between price and quantity as follows:

Find when = 225:

Find the revenue ( by multiplying the price per earphone ( by the quantity :

Conclusion:

The revenue in case the price of each earphone is $225 is $72,000.