Ipdf-to-latex

(IP presentation)

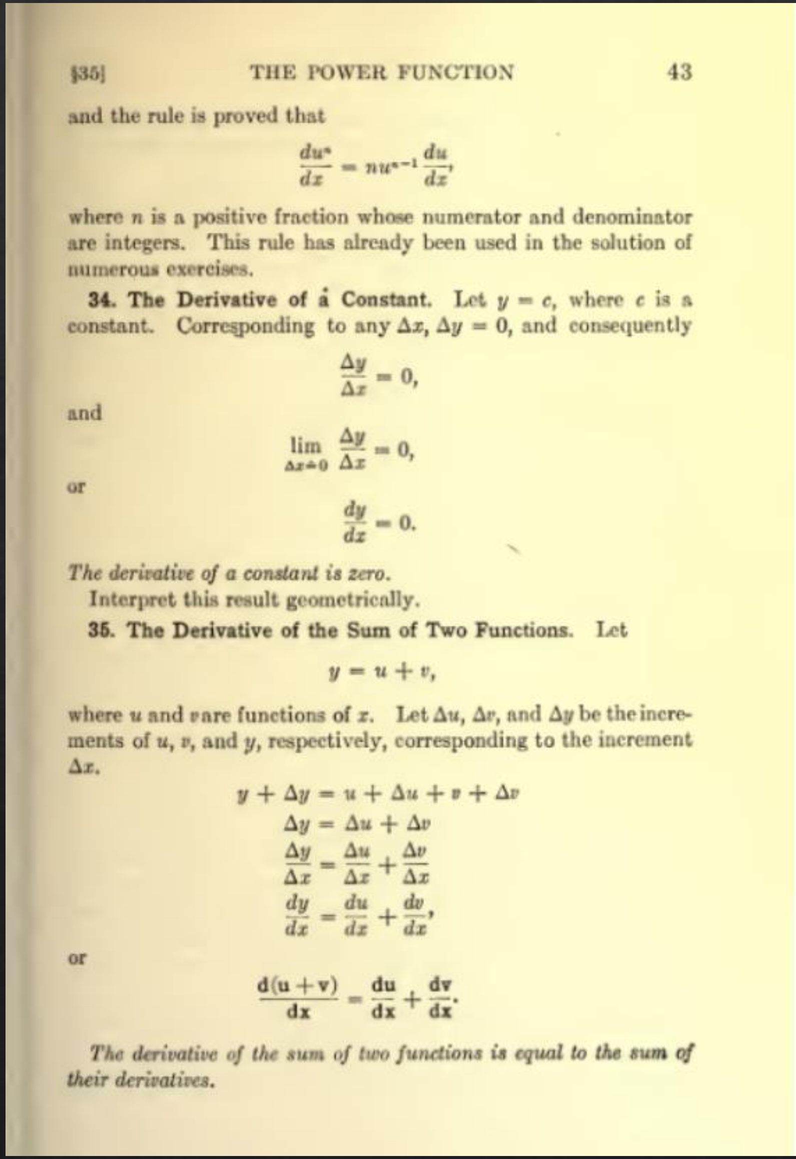
Learn AI easily

$$S=\int_{x}\left\{\frac{1}{2}\sum_{a}\partial^{\mu}\chi_{a}\partial_{\mu}\chi_{a}+V(\rho)\right\},$$

```
S=\int_{x}\left\{\frac{1}{2}\sum_{a}\partial^{\mu}
\chi_{a}\partial_{\mu}\chi_{a}+V(\rho)\right\},
```

By A.Gayen, M.Longatte, L.Mocq & M.Ottavy

I) Why this project?



and the rule is proved that

$$\frac{du^n}{dx} = nu^{n-1}\frac{du}{dx},$$

where n is a positive fraction whose numerator and denominator are integers. This rule has already been used in the solution of numerous exercises.

34. The Derivative of a Constant. Let $y = c$, where c is a constant. Corresponding to any Δx, $\Delta y = 0$, and consequently

$$\frac{\Delta y}{\Delta x} = 0,$$

and

$$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = 0,$$

or

$$\frac{dy}{dx} = 0.$$

The derivative of a constant is zero.

Interpret this result geometrically.

35. The Derivative of the Sum of Two Functions. Let

$$y = u + v,$$

where u and v are functions of x. Let Δu, Δv, and Δy be the increments of u, v, and y, respectively, corresponding to the increment Δx.

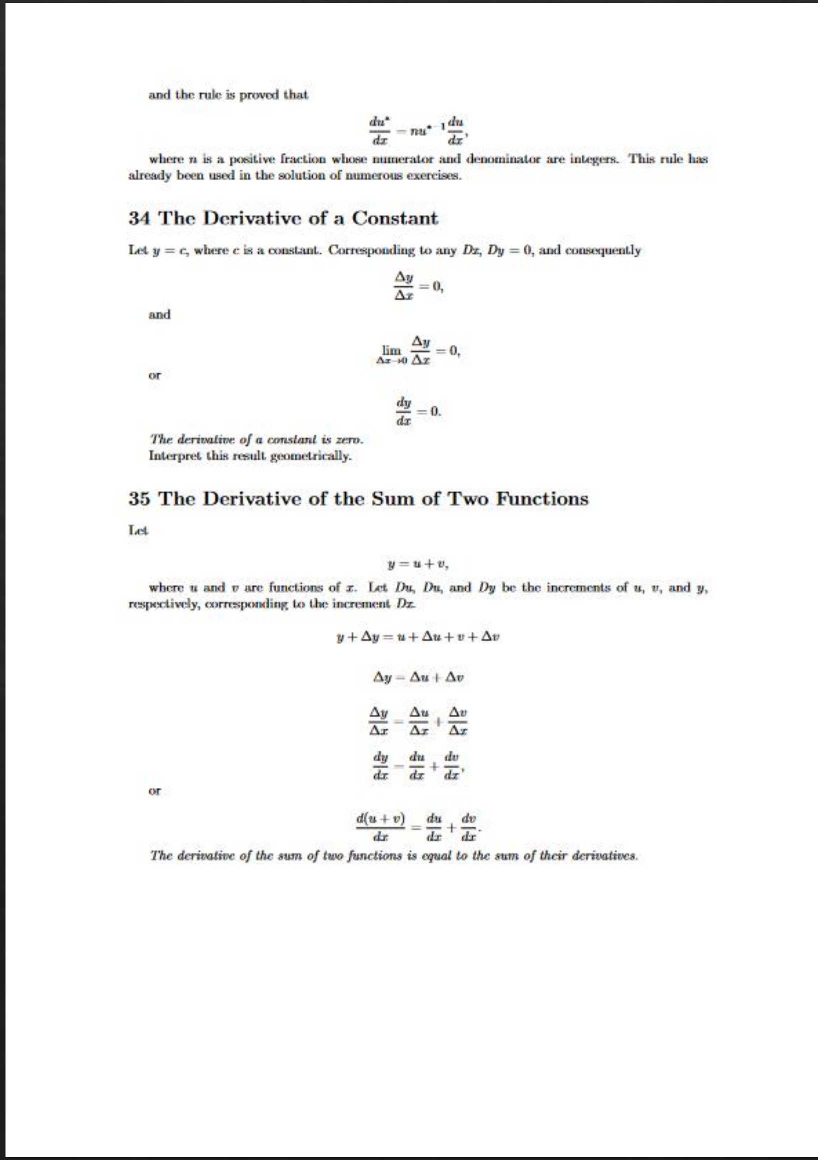
$$\begin{aligned} y + \Delta y &= u + \Delta u + v + \Delta v \\ \Delta y &= \Delta u + \Delta v \\ \frac{\Delta y}{\Delta x} &= \frac{\Delta u}{\Delta x} + \frac{\Delta v}{\Delta x} \\ \frac{dy}{dx} &= \frac{du}{dx} + \frac{dv}{dx}, \end{aligned}$$

or

$$\frac{\mathbf{d(u+v)}}{\mathbf{dx}} = \frac{\mathbf{du}}{\mathbf{dx}} + \frac{\mathbf{dv}}{\mathbf{dx}}.$$

The derivative of the sum of two functions is equal to the sum of their derivatives.

Nougat



and the rule is proved that

$$\frac{du^n}{dx} = nu^{n-1}\frac{du}{dx},$$

where n is a positive fraction whose numerator and denominator are integers. This rule has already been used in the solution of numerous exercises.

34 The Derivative of a Constant

Let $y = c$, where c is a constant. Corresponding to any Dx, $Dy = 0$, and consequently

$$\frac{\Delta y}{\Delta x} = 0,$$

and

$$\lim_{\Delta x \to 0} \frac{\Delta y}{\Delta x} = 0,$$

or

$$\frac{dy}{dx} = 0.$$

The derivative of a constant is zero.
Interpret this result geometrically.

35 The Derivative of the Sum of Two Functions

Let

$$y = u + v,$$

where u and v are functions of x. Let Du, Du, and Dy be the increments of u, v, and y, respectively, corresponding to the increment Dx.

$$y + \Delta y = u + \Delta u + v + \Delta v$$

$$\Delta y = \Delta u + \Delta v$$

$$\frac{\Delta y}{\Delta x} = \frac{\Delta u}{\Delta x} + \frac{\Delta v}{\Delta x}$$

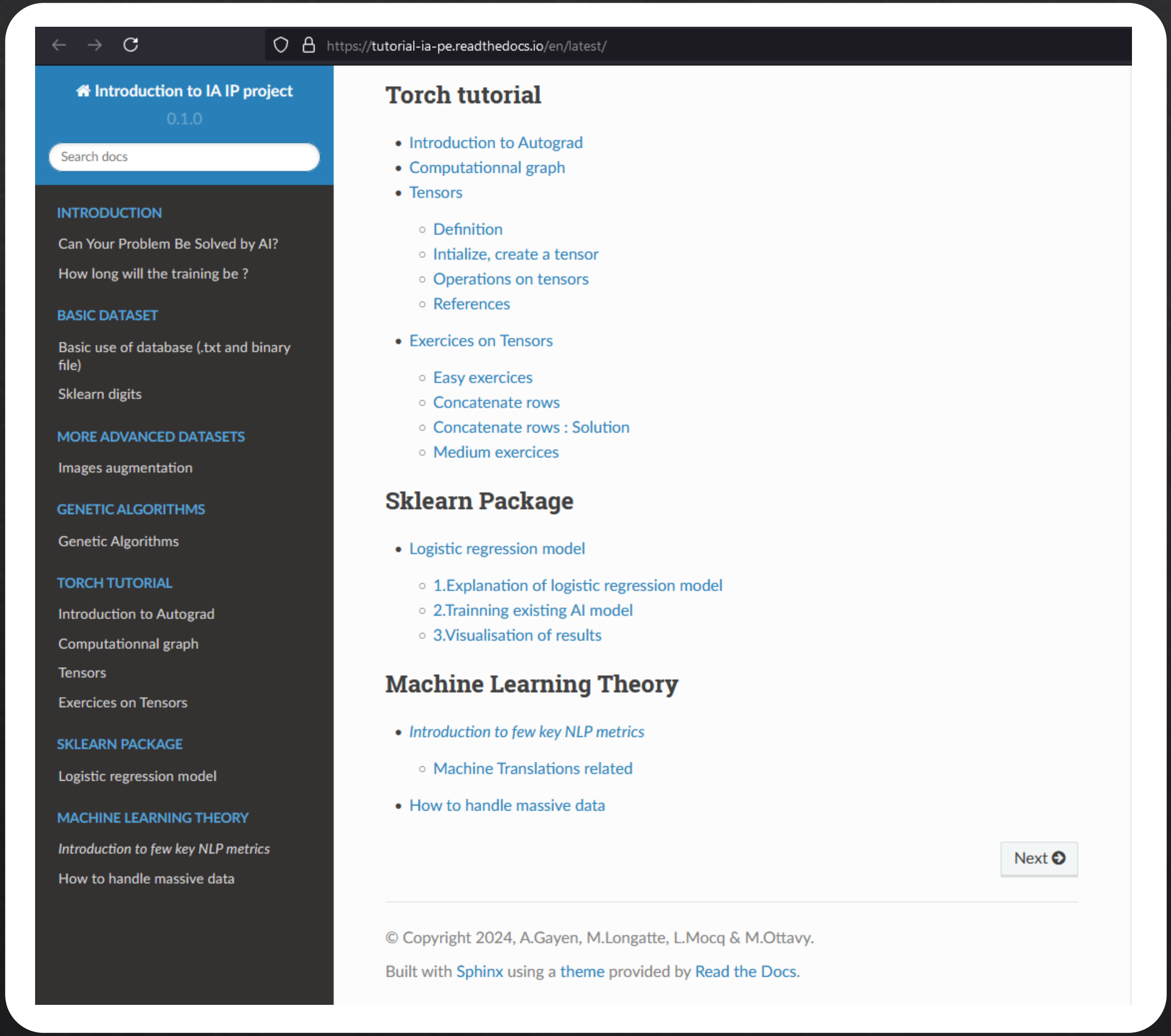
$$\frac{dy}{dx} = \frac{du}{dx} + \frac{dv}{dx},$$

or

$$\frac{d(u+v)}{dx} = \frac{du}{dx} + \frac{dv}{dx}.$$

The derivative of the sum of two functions is equal to the sum of their derivatives.

II) What is the project ?



Centralized ressources:

- Simple explanations
- Python code examples
- Theoretical explanations
- Proofs
- Tutorials and corrections
- Python class

III) Demonstration and some technical aspect

https://tutorial-ia-pe.readthedocs.io/en/latest/

(Link available on discord)

IV) How the team is organized and future work

Datasets

Basic data

- [x] (Macéo) Sklearn digits (splitting dataset)
- [ ] (Ankit) Analising datasets using sklearn
- [x] (Ankit)Transforming images to usable array
- [ ] (Louison) Using .xls document
- [x] (Macéo) Basic use of datatbase (from .txt file), usual format, name, organisations

(Mathieu) Pandas

- [ ] Explain dataframes
- [ ] How to read data from csv
- [ ] How to write data in csv
- [ ] How to use the data
- [ ] How to visualize data
- [ ] How to deal with missing features
- [ ] How to discover data : main caracteristics

More advanced use of data

- [x] (Macéo) add some variations to images(cf nougat article)
- [ ] What is JSON files and how to use them
- [ ] Download and use data from huggin face
- [ ] What are the convention to organize a projet in datascience in order to have juste a clean project, the goal is not to have the best commented and tested project (how to separate files, between training, evaluation and how to name files : what name for saved model)
- [ ] (Louison) Data augmentation

Pytorch tutorial

- [ ] (*Mathieu) Pytorch (Tensors, Data loader, Optimizer, Save model): Do better than https://pytorch.org/tutorials/beginner/basics/intro.html

Machine Learning theory :

- [x] (Macéo) Genetics algorithm
- [ ] (Macéo) MOGA
- [ ] (Macéo) module Neat
- [ ] (Macéo) Gymnasium module
- [ ] Q-learning
- [ ] Deep Q-learning
- [ ] Using existing models from hugging faces (Solving problem for GPU drivers/ GPUless computer)
- [x] (Louison) Why it will not work : Curse of dimensionnality
- [x] (Louison) Why it will work : symetries of the problem
- [x] (Louison) Neural networks : Universality theorem
- [ ] (Macéo) Classifier
- [ ] Convolutionnal networks
- [ ] Pitfalls of other models, ex: RNNs
- [ ] Transformers
- [ ] OCR
- [ ] Tokens / Tokenizer
- [x] (Louison) Why GPU compute faster than CPU ?
- [ ] (Macéo) Digit recognition -> Logistic regression
- [ ] Encoder / decoder ?
- [x] (Louison) How do handle massive data ? (Download millions of arxiv articles and process them for example compute the mean of number of caracters or whatever)
- [x] *(Ankit) Levenshtein distance, Recall , Accuracy, F1, etc(intro to metrics)+ TP on NLTK to compare and use these metrics
- [x] (Louison) How to do predict the complexity of a model depending on the data structure you use, how you read the data, the optimizer, the number of layers of a neural networks...

- Building complete guide to recreate Pix2Tex
- Upgrade the website