

Vietnam National University Ho Chi Minh City  
Ho Chi Minh City University of Technology  
FACULTY OF MECHANICAL ENGINEERING  
MECHATRONICS DEPARTMENT

Project Report

Topic

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**A TYPE OF MACHINE**

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# Preface

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# Chapter 1.

## Introduction

### 1. Image

An image may be defined as a two-dimensional function,  $f(x, y)$ , where  $x$  and  $y$  are spatial (plane) coordinates, and the amplitude of  $f$  at any pair of coordinates  $(x, y)$  is called the *intensity* or *gray level* of the image at that point. When  $x, y$ , and the intensity values of  $f$  are all finite, discrete quantities, we call the image a *digital image*.



**Fig 1.1.** lena.jpeg - the first JPEG format image

2-D Fourier Transform:

$$H(\omega_x, \omega_y) = \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} h(x, y) e^{-j(\omega_x x + \omega_y y)} dx dy \quad (1.1)$$

Schrodinger equation in Spherical Coordinates:

$$-\frac{\hbar^2}{2m} \left( \frac{1}{r^2} \frac{\partial}{\partial r} \left( r^2 \frac{\partial \psi}{\partial r} \right) + \frac{1}{r^2 \sin \theta} \frac{\partial}{\partial \theta} \left( \sin \theta \frac{\partial \psi}{\partial \theta} \right) + \frac{1}{r^2 \sin^2 \theta} \frac{\partial^2 \psi}{\partial \phi^2} \right) + U(r) \psi = E \psi \quad (1.2)$$

# Conclusion

# Bibliography

- [1] Lê Đức Hạnh (2024), *Computer Vision lecture slide*, Ho Chi Minh City University of Technology.
- [2] Lê Đức Hạnh (2023), *Thị giác máy tính và ứng dụng trong Robotics*, VNUHCM Press.