

ODES!!!!

I. DIFFERENTIAL EQUATIONS CAN BE CLASSIFIED IN VARIOUS WAYS, INCLUDING BY ORDER, LINEARITY, AND WHETHER OR NOT THEY ARE HOMOGENEOUS.

- **Order: A differential equation is an equation that involves derivatives of a function.**

The order of a differential equation is the highest derivative that appears in the equation. For example, a second-order differential equation contains the second derivative of a function, but not the third derivative.

- **Linearity: A differential equation is considered linear if it is of the form:**

- **$a(x)y' + b(x)y = c(x)$**

- **Where y' is the first derivative of y and $a(x)$, $b(x)$ and $c(x)$ are functions of x**

- **Homogeneous: A differential equation is homogeneous if the right-hand side is equal to zero.**

- **Examples of different types of differential equations include:**

- **First-order, linear differential equations**

- **Second-order, homogeneous linear differential equations with constant coefficients**

- **Nonlinear, first-order differential equations.**
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Some online materials that you can use for ur study!!

- TEXTBOOK: "ELEMENTARY DIFFERENTIAL EQUATIONS AND BOUNDARY VALUE PROBLEMS" BY BOYCE AND DIPRIMA IS A WIDELY USED TEXTBOOK THAT COVERS THE BASICS OF DIFFERENTIAL EQUATIONS AND INCLUDES MANY WORKED EXAMPLES.
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- ONLINE COURSE: "DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA" BY GILBERT STRATING ON MIT OPENCOURSEWARE (OCW) IS A COMPREHENSIVE COURSE THAT COVERS BOTH ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS, AS WELL AS LINEAR ALGEBRA.
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- YOUTUBE CHANNELS:
- "KHAN ACADEMY" HAS A COLLECTION OF VIDEOS ON DIFFERENTIAL EQUATIONS, INCLUDING EXPLANATIONS OF KEY CONCEPTS AND EXAMPLES OF SOLVING DIFFERENT TYPES OF DIFFERENTIAL EQUATIONS.
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- "PATRICKJMT" HAS A SERIES OF VIDEOS ON DIFFERENTIAL EQUATIONS, INCLUDING BOTH BASIC AND ADVANCED TOPICS.
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- "3BLUE1BROWN" HAS A VIDEO SERIES ON DIFFERENTIAL EQUATIONS WHICH IS KNOWN FOR ITS CLEAR EXPLANATIONS AND VISUAL ANIMATIONS, WHICH CAN BE VERY HELPFUL FOR UNDERSTANDING THE SUBJECT.
- ONLINE TUTORIALS:
- "PAUL'S ONLINE NOTES" IS A WEBSITE THAT PROVIDES A VARIETY OF RESOURCES FOR LEARNING ABOUT DIFFERENTIAL EQUATIONS, INCLUDING NOTES, EXAMPLES, AND INTERACTIVE APPLETS.
 - "MATH24.NET" IS A WEBSITE THAT PROVIDES A COLLECTION OF FREE ONLINE TUTORIALS ON DIFFERENTIAL EQUATIONS, INCLUDING EXPLANATIONS OF KEY CONCEPTS AND EXAMPLES OF SOLVING DIFFERENT TYPES OF DIFFERENTIAL EQUATIONS.

THESE RESOURCES SHOULD PROVIDE A GOOD STARTING POINT FOR LEARNING ABOUT DIFFERENTIAL EQUATIONS. IT'S ALWAYS HELPFUL TO PRACTICE SOLVING PROBLEMS AND WORK THROUGH EXAMPLES TO DEVELOP A DEEPER UNDERSTANDING OF THE SUBJECT.