



Higher Order Constant Coefficient ODE - I

Detailed Course on Differential Equation for IIT JAM' 23 - II



Gajendra Purohit ✓

Legend in CSIR-UGC NET & IIT-JAM

~ Unlock Code : GPSIR ~ PhD, CSIR NET (Maths) | Youtuber(800K+165K Sub.)/Dr.Gajendra Purohit (Maths), 17+ Yr. Experience, Author

50M Watch mins

3M Watch mins (last 30 days)

44K Followers

2K Dedications

➔ **TOP EDUCATOR ON UNACADEMY
FOR CSIR NET & IIT JAM**

YouTuber with 800K Subscribers

➔ **AUTHOR OF BEST SELLER BOOK
FOR CSIR NET & IIT JAM**

**Get
10% Off**

Referral Code : GP SIR





CSIR

We heard you and upgraded the
Ask a Doubt feature to suit your needs!
Unacademy Ask a Doubt



The **Ask a Doubt** feature is now
available on the **Website and the
Learner App**. Getting your doubts
clarified is easier and faster than before!

ASK A DOUBT



RANK BOOSTER COURSE UNIT 3 **CSIR NET 2022**

1st AUGUST

Gajendra Purohit

Enroll Now

USE CODE

GPSIR

FOR 10% OFF





DETAILED COURSE 2.0 DIFFERENTIAL EQUATION

4th AUGUST

Gajendra Purohit

Enroll Now

USE CODE
GPSIR
FOR 10% OFF



Introducing UA Lite for CSIR-UGC NET

1 month subscription at ₹1,500
2 month subscription at ₹2,100

Get access to :

- Curated Test Series
- Question Bank
- Exams of Previous Year Question Papers

Subscribe Now

Use code - GPSIR



FEE DETAILS FOR IIT JAM SUBSCRIPTION

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 908 / mo
Save 67% Total ₹ 21,780

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,248 / mo
Save 54% Total ₹ 14,974

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,497 / mo
Save 45% Total ₹ 13,475

6 months ₹ 2,042 / mo
Save 25% Total ₹ 12,252

3 months ₹ 2,269 / mo
Save 17% Total ₹ 6,807

1 month ₹ 2,723 / mo
Total ₹ 2,723

To be paid as a one-time payment

Have a referral code?

Proceed to pay

Get
10% Off

After Using
My Referral
Code

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 817 / mo
Save 67% ~~₹ 24,700~~ ₹ 19,602

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,123 / mo
Save 54% ~~₹ 14,974~~ ₹ 13,477

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,348 / mo
Save 45% ~~₹ 13,475~~ ₹ 12,128

6 months ₹ 1,838 / mo
Save 25% ~~₹ 12,252~~ ₹ 11,027

3 months ₹ 2,042 / mo
Save 17% ~~₹ 6,807~~ ₹ 6,126

GPSIR

Awesome! You get 10% off

Proceed to pay

TRAJECTORIES

A curve which cuts every members of a given family of curve in accordance with same given law is called trajectory of the given family of curve.

Types of Trajectory

- (1) **Orthogonal trajectory** : If a curve cuts every member of given family of curves at right angle, it is called an orthogonal trajectory.
- (2) **Oblique trajectory** : If a curve cuts every member of a given family of curves at an angle $\alpha (\neq 90^\circ)$, it is called an oblique trajectory.



Determination of orthogonal trajectories in Cartesian coordinates :

Step – 1 : Differentiate the given equation of the family of curves, eliminate the parameter.

Step – 2 : Replace dy/dx by $-dx/dy$.

Step – 3 : Solve this new DE and we obtain orthogonal trajectory.

Self orthogonal family of curves :

If each member of a given family of curves intersects all other members orthogonally then given family of curves is said to be self orthogonal.

Note : The differential equation of the family of curve is identical with differential equation of its orthogonal trajectories.

Q.1 Which one of the following curves is the orthogonal trajectory of straight line passing through fixed point $(5, 6)$?

- A) $(x - 5)^2 = c(y - 6)$
- B) $(x - 5) = c(y - 6)$
- C) $(x - 5)^2 + (y - 6)^2 = c$
- D) None of these

Q.2. The value of $a \in \mathbb{R}$ for which the curves $x^2 + ay^2 = 1$ and $y = x^2$ intersect orthogonally is

(a) -2

(b) $-\frac{1}{2}$

(c) $\frac{1}{2}$

(d) 2

TARGETED AUDIENCE

- **IIT-JAM**

- **M.Sc. Entrance Exam**

COMPLETE COURSE ON
MATHEMATICS
FOR IIT-JAM 2022

TOPICS TO BE COVERED

- **REAL ANALYSIS**
- **FUNCTION OF ONE & TWO VARIABLE**
- **LINEAR ALGEBRA**
- **MODERN ALGEBRA**

TOPICS TO BE COVERED

- SEQUENCE & SERIES
- INTEGRAL CALCULUS
- VECTOR CALCULUS
- DIFFERENTIAL EQUATION

FEE DETAILS FOR IIT JAM SUBSCRIPTION

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 908 / mo
Save 67% Total ₹ 21,780

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,248 / mo
Save 54% Total ₹ 14,974

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,497 / mo
Save 45% Total ₹ 13,475

6 months ₹ 2,042 / mo
Save 25% Total ₹ 12,252

3 months ₹ 2,269 / mo
Save 17% Total ₹ 6,807

1 month ₹ 2,723 / mo
Total ₹ 2,723

To be paid as a one-time payment

Have a referral code?

Proceed to pay

Get
10% Off

After Using
My Referral
Code

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 817 / mo
Save 67% ~~₹ 24,700~~ ₹ 19,602

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,123 / mo
Save 54% ~~₹ 14,074~~ ₹ 13,477

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,348 / mo
Save 45% ~~₹ 13,475~~ ₹ 12,128

6 months ₹ 1,838 / mo
Save 25% ~~₹ 12,252~~ ₹ 11,027

3 months ₹ 2,042 / mo
Save 17% ~~₹ 6,807~~ ₹ 6,126

GPSIR

Awesome! You get 10% off

Proceed to pay

FOUNDATION COURSE OF
MATHEMATICS
FOR CSIR-NET

Q.3. The integral curves of the first order linear differential equation $x \frac{dy}{dx} + ay = 0$ will be orthogonal to the family of hyperbolas $x^2 - by^2 = c$ if and only if

- A) $a + b = 0$ B) $a \ b = 1$
C) $a - b = 0$ D) $a \ b = -1$

The orthogonal trajectories of family of curves $3xy = x^3 - a^3$, a being parameter of family, is of the form $x^2 = y + f(y)$ and satisfies $y(0) = 0$. then $f(\log 2)$ is

- (a) 0.37 (b) -0.37
(c) 0.40 (d) 0.5



CSIR

We heard you and upgraded the
Ask a Doubt feature to suit your needs!
Unacademy Ask a Doubt



The **Ask a Doubt** feature is now
available on the **Website and the
Learner App**. Getting your doubts
clarified is easier and faster than before!

ASK A DOUBT



RANK BOOSTER COURSE UNIT 3 **CSIR NET 2022**

1st AUGUST

Gajendra Purohit

Enroll Now

USE CODE

GPSIR

FOR 10% OFF





DETAILED COURSE 2.0 DIFFERENTIAL EQUATION

4th AUGUST

Gajendra Purohit

Enroll Now

USE CODE
GPSIR
FOR 10% OFF



Introducing UA Lite for CSIR-UGC NET

1 month subscription at ₹1,500
2 month subscription at ₹2,100

Get access to :

- Curated Test Series
- Question Bank
- Exams of Previous Year Question Papers

Subscribe Now

Use code - GPSIR



Educator Profile



Gajendra Purohit ✓

#5 Educator in CSIR-UGC NET

Dr.Gajendra Purohit PhD, CSIR NET (Maths) | Youtuber(330K+30k Sub.)/Dr.Gajendra Purohit (Maths), 17+ Yr. Experience, Author of Bestseller

Follow

11M Watch mins

1M Watch mins (last 30 days)

22k Followers

1k Dedications



CSIR-UGC NET

SEE ALL

Educator highlights

- Works at Pacific Science College
- Studied at M.Sc., NET, PhD(Algebra), MBA(Finance), BEd
- PhD, NET | Plus Educator For CSIR NET | Youtuber (260K+Subs.) | Director Pacific Science College |
- Lives in Udaipur, Rajasthan, India
- Unacademy Educator since



HINDI MATHEMATICAL SCIENCES

Course on Linear Algebra, Partial Diff. Equation & Calculus

Starts on Mar 1, 2021 • 24 lessons

Gajendra Purohit



HINDI MATHEMATICAL SCIENCES

Course on Complex Analysis & Integral Equation

Starts on Jan 14, 2021 • 16 lessons

Gajendra Purohit



HINDI MATHEMATICAL SCIENCES

Foundation Course on Mathematics for CSIR 2021

Starts on Dec 7, 2020 • 20 lessons

Gajendra Purohit

FEE DETAILS FOR IIT JAM SUBSCRIPTION

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 908 / mo
Save 67% Total ₹ 21,780

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,248 / mo
Save 54% Total ₹ 14,974

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,497 / mo
Save 45% Total ₹ 13,475

6 months ₹ 2,042 / mo
Save 25% Total ₹ 12,252

3 months ₹ 2,269 / mo
Save 17% Total ₹ 6,807

1 month ₹ 2,723 / mo
Total ₹ 2,723

To be paid as a one-time payment

Have a referral code?

Proceed to pay

Get
10% Off

After Using
My Referral
Code

● No cost EMI available on 6 months & above subscription plans

24 months ₹ 817 / mo
Save 67% ~~₹ 24,700~~ ₹ 19,602

You get 6 months extra for free Offer expires 15 Jun 2022

✓ 12 months ₹ 1,123 / mo
Save 54% ~~₹ 14,074~~ ₹ 13,477

You get 6 months extra for free Offer expires 15 Jun 2022

9 months ₹ 1,348 / mo
Save 45% ~~₹ 13,475~~ ₹ 12,128

6 months ₹ 1,838 / mo
Save 25% ~~₹ 12,252~~ ₹ 11,027

3 months ₹ 2,042 / mo
Save 17% ~~₹ 6,807~~ ₹ 6,126

GPSIR

Awesome! You get 10% off

Proceed to pay

THANK YOU VERY MUCH EVERYONE

GET THE UNACADEMY PLUS SUBSCRIPTION SOON.

TO GET 10% DISCOUNT IN TOTAL SUBSCRIPTION AMOUNT

USE REFERRAL CODE: [GPSIR](#)