



SNS COLLEGE OF ENGINEERING  
Kurumbapalayam (Po), Coimbatore – 641 107



AN AUTONOMOUS INSTITUTION

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

### Topic: 1 – TUTORIAL III

#### Quadratic form to Canonical form

1. Reduce the quadratic form  $2x_1x_2 + 2x_2x_3 + 2x_3x_1$  into canonical form.
2. Reduce the quadratic form  $8x_1^2 + 7x_2^2 + 3x_3^2 - 12x_1x_2 - 8x_2x_3 + 4x_3x_1$  into canonical form by means of an orthogonal transformation.
3. Reduce the quadratic form  $2x^2 + 5y^2 + 3z^2 + 4xy$  to canonical form by orthogonal reduction and state its nature.
4. Reduce the quadratic form  $10x_1^2 + 2x_2^2 + 5x_3^2 + 6x_2x_3 - 4x_3x_1 - 4x_1x_2$  to a canonical form through an orthogonal transformation and hence find rank, index, signature, nature and also give non-zero set of values for  $x_1, x_2, x_3$ (if they exist), that will make the quadratic form zero.
5. Reduce the quadratic form  $x^2 + 5y^2 + z^2 + 2xy + 2yz + 6zx$  to canonical form and hence find its rank.



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