

Demographics and U.S. Presidential Elections

Can Changing Population Characteristics Explain Elections?

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States

I was assigned 5 states in the mid-Atlantic region of the United States

- Maryland
- Pennsylvania
- New Jersey
- Virginia
- Delaware
 - Level sets in linear \rightarrow hyperplanes $ax = b$
 - Common for econ: budget sets

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- Next up... Quadratic forms

Quadratic Forms

$$f(x) = bx^2$$

Definition 4.D

A quadratic form on \mathbb{R}^k is a real-valued function of the form

$$Q(x_1, \dots, x_k) = \sum_{i,j=1}^k a_{ij}x_i x_j.$$

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Level curve: $a_{11}x_1^2 + a_{12}x_1x_2 + a_{22}x_2^2 = b$

→ ellipse, hyperbola, pair of lines, empty set (i.e. conic sections)

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Matrix Representation (“Expansion around a matrix”)

$$(x_1 \ x_2) \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$