Define: $X = [x_1, x_2, \ldots, x_n]'$ where $X$ denotes transpose.
Theorem \[
\beta(\mathbf{A}) = \beta \left( \bigcap_{\mathbf{X}} \mathbf{A} \right)
\]

\[
\mathbf{A} \in \bigcap_{\mathbf{X}} \mathbf{A} \quad \iff \quad \mathbf{X} \subseteq \mathbf{A},
\]

where \( \mathbf{X} \in \mathbf{I} \) and \( \mathbf{I} \in \mathbf{I} \).
Defn 5.3: Multivariate Joint LDP

The joint LDP of a continuous $X_1, X_2, ...$, is defined by

$$LDP \left( \left( x_1, x_2, ... \right) \right) = \left( \left( f_1(x), f_2(x), ... \right) \right) \qquad \left( f_1, f_2, ... \right)$$

provided that $f_1, f_2, ...$ are differentiable.
\[ f(y) = \frac{1}{2} \left( 2 - \frac{y}{5} \right) \text{ for } 0 \leq y \leq 5 \]

**Sim.** 0.8%.

Therefore,

\[ f(y) = \frac{1}{2} \text{ for } 0 \leq y \leq 5 \]

and

\[ \int_0^5 f(y) dy = \frac{1}{2} \left( 2 \cdot 5 \right) = 5 \]

Therefore, we have

\[ 0 \leq \frac{1}{2} \left( 2 - \frac{y}{5} \right) \leq 1 \text{ for } 0 \leq y \leq 5 \]
Thus, \( \frac{f^1(u, \xi)}{\nu^1} = \frac{f^2(u, \xi)}{\nu^2} = \frac{f^3(u, \xi)}{\nu^3} \). This means that \( X \) is independent of \( \nu \).
\[ f(m) = \frac{d}{d\ln m} \left( \frac{1}{1 - F(x)} \right) \]

\[ F(m) = 1 - \frac{1}{\int_{m}^{\infty} (1 - F(x)) \, dx} \]

\[ = \int_{m}^{\infty} \frac{1}{x} \, dx \]

\[ = \left[ \frac{\ln x}{x} \right]_{m}^{\infty} = \ln m \]

\[ M = \min \{ x_1, x_2, \ldots, x_n \} \]
This is a calculus problem involving the function $f(x)$. We are given the function $f(x) = \frac{x}{1 + x^2}$, and we need to find its derivative $f'(x)$. To do this, we use the quotient rule:

$$f'(x) = \frac{(1)(x) - (x^2)(1)}{(1 + x^2)^2} = \frac{1 - x^2}{(1 + x^2)^2}.$$
Thus the value $\int_{a}^{b} f(x) \, dx = \frac{b - a}{2}$.

\[ \left\{ x \in \mathbb{R} \mid x \leq x_0 + dx \right\} \cup \left\{ y \in \mathbb{R} \mid y \leq y_0 + dy \right\} \]

$\exp dx \quad \exp \quad \exp dx$

\[ \left[ x_0, x_0 + dx \right] \]

\[ \left( x_0^2 - dx \right) \left( x_0^2 + dx \right) \]

$f(x) \, dx = \frac{b - a}{2}$ is the probability density.
\[
\frac{\partial}{\partial x} \left( \frac{\partial f}{\partial x} \right) = \frac{\partial}{\partial y} \left( \frac{\partial f}{\partial y} \right) = \frac{\partial f}{\partial x} \frac{\partial f}{\partial y} = 0
\]

\[
\exp \left[ \int \frac{\partial f}{\partial x} \frac{\partial f}{\partial y} \right] + \exp \left[ \int \frac{\partial f}{\partial y} \frac{\partial f}{\partial x} \right] = \exp \left[ \int \frac{\partial f}{\partial x} \frac{\partial f}{\partial y} \right]
\]

\[
\left\{ x \in \mathbb{R}^3 \mid \frac{\partial f}{\partial x} = 0 \right\} + \left\{ y \in \mathbb{R}^3 \mid \frac{\partial f}{\partial y} = 0 \right\} = \left\{ (x, y) \in \mathbb{R}^2 \mid \frac{\partial f}{\partial x} = 0 \right\}
\]
be jointly Gaussian.

Thus \( \mathbf{X} = \mathbf{x} \) is a multivariate Gaussian:

\[
\mathbf{X} \sim \mathcal{N}(\mathbf{0}, \mathbf{\Sigma}).
\]

Note that any \( \mathbf{X}_i \) for any \( i \geq 5 \) is Gaussian, or jointly normal, if any of the Gaussian are jointly normal.

\[
\mathbf{X} = (\mathbf{x}_1, \mathbf{x}_2, \ldots, \mathbf{x}_n) \text{ are called jointly Gaussian.}
\]
3. Their generators are nonnegative.

\[ \langle \bar{x} \rangle = \mathbb{R}^n \]

4. For any \( \bar{x} \) and \( \bar{x} \) in \( \mathbb{R}^n \),

\[ \bar{x} \in \mathbb{R}^n \text{ if and only if } \bar{x} \in \mathbb{R}^n \]

They are nonnegative definitely.
\[ \begin{bmatrix} \Gamma \end{bmatrix} \begin{bmatrix} \delta \end{bmatrix} = 0 \]

\[ A \begin{bmatrix} \epsilon \end{bmatrix} = \begin{bmatrix} 0 \end{bmatrix} \]

Consider an \( n \times n \) square matrix \( A \) (e.g., singular value decomposition).

\( A \) is a \( n \times n \) matrix.

Find the eigenvectors \( \lambda_i \) of \( A \), i.e.,

\[ A \begin{bmatrix} x \end{bmatrix} = \lambda \begin{bmatrix} x \end{bmatrix} \]

where \( \lambda \) are the eigenvalues.
Let \( A = \mathbb{C} \times D \), where \( A = \mathbb{C} \).

If \( D \) is a disk, then \( \frac{1}{n} \to \infty \) as \( n \to \infty \).

Since \( A \) is symmetric, \( x = 0, y = 0 \) is the center.

Thus, \( E \) contains all nonzero column vectors.

Since \( E \subset \mathbb{C} \), \( E = I \cdot \mathbb{C} \).

Thus \( A = E \subset D \).

If \( A \) can be decomposed as