Fun Math and Statistics in LaTeX

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Introduction

Math is great!

1 Variance of Sample Average

Given random variables $X_1, ..., X_n$ each with variance σ^2, $Var(\bar{X}_n) = \frac{\sigma^2}{n}$.

Proof.

$$\begin{aligned} Var(\bar{X}_n) &= Var\left(\frac{X_1, ..., X_n}{n}\right) \\ &= (\frac{1}{n})^2 \sum_{i=1}^{n} \sigma_i^2 \\ &= \frac{\sigma^2}{n} \end{aligned}$$

□

2 Integrals

Integral	Evaluates to...
$\int_a^b k dx$	$kx + c$

3 Matrices

3.1 The identity matrix

- $\mathbf{I}_{2\times 2} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$
- Symmetric and idempotent

3.2 Matrix programming in MATLAB

```
B = [7, 8; 9, 10];

% Find eigenvalues
eB = eig(B)
```

4 Graph of normal distribution

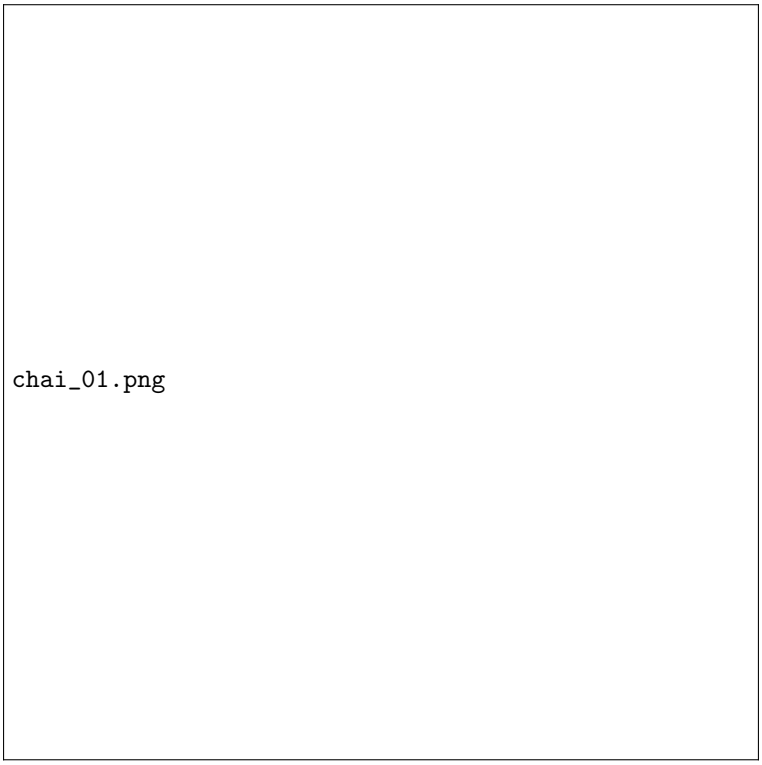

Figure 1: PDF