



Example

- A simulation experiment runs 9 times to measure the quantity X and provides the following results:

$$\hat{x} = \frac{1}{9} \sum_{i=1}^9 x_i = 65 \quad \text{and} \quad \sum_{i=1}^9 (x_i - \hat{x})^2 = 3560$$

- Estimate the variance of X
- Compute the 90% and 99% confidence intervals



Example

- 99% confidence interval:
 - Use the Student's t with 8 degrees of freedom
 - $\alpha=0.01$, $\alpha/2=0.005$
 - Use the value $t_{8,0.005}=3.36$

$$I_{0.99} = [65 - 3.36 * \sqrt{445 / 3}, 65 + 3.36 * \sqrt{445 / 3}]$$

$$I_{0.99} = [41.37, 88.63]$$



Example

```
from scipy.stats import t
import math
```

```
t.interval(0.99,
```

```
8,
```

```
65,
```

```
math.sqrt(445/9) )
```

confidence level

k degrees of freedom

estimation of the variable
of interest (sample mean)

sample standard error

<https://docs.scipy.org/doc/scipy/reference/generated/scipy.stats.t.html>