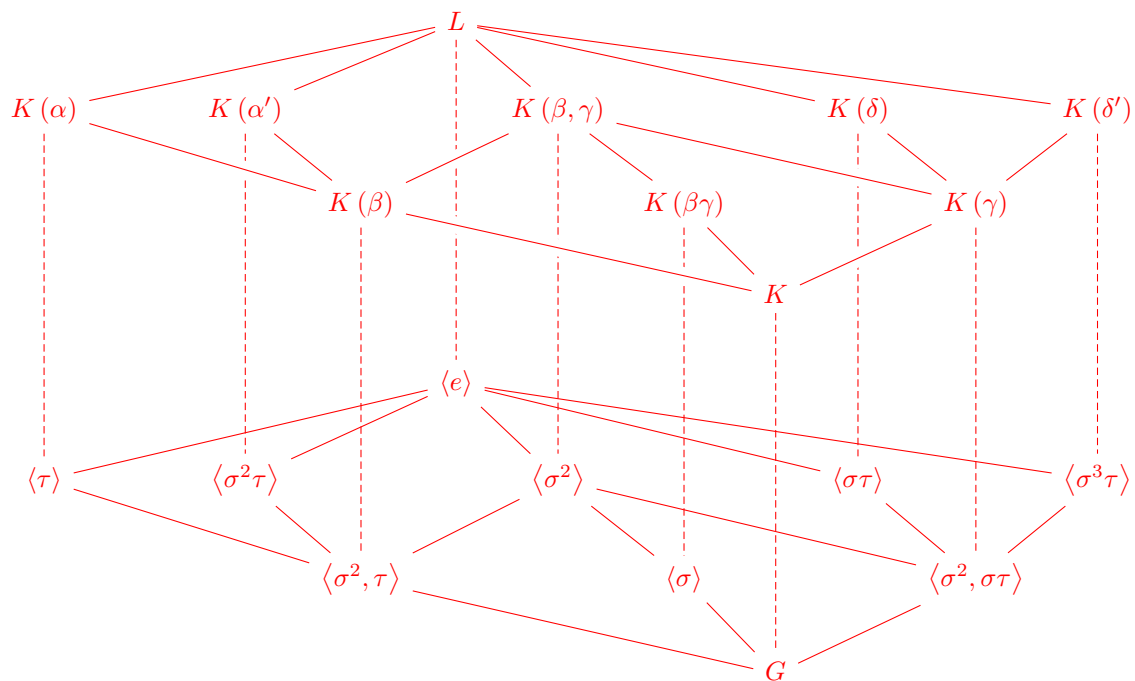


# MATH40005B Statistic

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$$G = \text{Gal}(L/K) \cong \mathcal{D}_8$$

## Syllabus

Measures of central tendency and dispersion, Hypothesis testing, Covariance, Correlation, Statistical models, Likelihood, Linear regression, Bayesian inference, Conjugate pair distributions, Empirical distribution, Bootstrap

**Contents**

## 0 Introduction

Lecture 1  
Thursday  
10/01/19

The following are references.

- E Artin, Galois theory, 1994
- A Grothendieck and M Raynaud, Revêtements étales et groupe fondamental, 2002
- I N Herstein, Topics in algebra, 1975
- M Reid, Galois theory, 2014

**Notation.** If  $K$  is a field, or a ring, I denote

$$K[X] = \{a_0 + \cdots + a_n X^n \mid a_i \in K\},$$

the **ring of polynomials** with coefficients in  $K$ .

## 1 Central tendency and dispersion

- 1.1 Mean, variance and moments
- 1.2 Parameter estimation
- 1.3 Other measures of central tendency
- 1.4 Sampling from normal RVs

## 2 Hypothesis testing

- 2.1 Introduction
- 2.2 Single sample hypothesis testing
- 2.3 Distribution of p-values
- 2.4 Errors
- 2.5 Two sample hypothesis testing
- 2.6 Multiple hypothesis testing

## 3 Covariance and Correlations

- 3.1 Covariance
- 3.2 Correlation

## 4 Statistical models

- 4.1 Definitions
- 4.2 Likelihood
- 4.3 Linear regression

## 5 Bayesian inference

- 5.1 Definitions
- 5.2 Conjugate pair distributions
- 5.3 Intractable posteriors
- 5.4 Choosing a prior

## 6 Bootstrap

- 6.1 Empirical distribution
- 6.2 Bootstrap procedure