Analyzing Tonality with Note Distributions

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Research Question

« What can we learn about the history of tonality by analyzing note distributions of musical pieces? »
Representation of Music

Allemande.
Representation of Music

Allemande.
Representation of Music

![Bar graph showing count by pitch class. The graph is labeled with count on the y-axis and pitch class on the x-axis. The bars are shaded blue and black, indicating the distribution of counts across pitch classes.](image-url)
« Are there other representations of musical pieces? »
Representations: Tonnetz

Hostinský (1879): Die Lehre von den musikalischen Klängen.
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Representations: Tonnetz

Hostinský (1879): *Die Lehre von den musikalischen Klängen.*
History of Tonality in Note Distributions?

J. S. Bach: Prelude in C major (BWV 846; 1722)

F. Schubert: Impromptu in Eb major (op. 90/2; 1827)

~ 100 years
History of Tonality in Note Distributions?

J. S. Bach: Prelude in C major (BWV 846; 1722)

F. Schubert: Impromptu in Eb major (op. 90/2; 1827)
Representations: Line of Fifths

J.S. Bach, Preludium in C major, BWV 846.
Representations: Line of Fifths

J.S. Bach, Preludium in C major, BWV 846.

- mixture distribution
  - $\mu=-0.48$, $\sigma^2=2.13$, $w=0.72$
  - $\mu=3.15$, $\sigma^2=1.28$, $w=0.28$
  - pitch-class ratios


- mixture distribution
  - $\mu=0.54$, $\sigma^2=0.37$, $w=0.14$
  - $\mu=4.83$, $\sigma^2=3.99$, $w=0.27$
  - $\mu=-5.94$, $\sigma^2=3.27$, $w=0.22$
  - $\mu=-3.08$, $\sigma^2=1.46$, $w=0.37$
  - pitch-class ratios
Representations: Line of Fifths

J.S. Bach, Preludium in C major, BWV 846.

Historical development of tonality
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