

The Multileveled Rhythmic Structure of Ragtime Jason Yust, Boston University Phillip B. Kirlin, Rhodes College

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Outline of the Talk

- (1) Corpus and Methodology
 - —Joplin, Scott, and Lamb. Rag forms and phrase structure.
 - -Rhythmic vectors and Hadamard transform.
- (2) Example: Joplin, "The Nonpareil"
- (3) Results and conclusion
 - —By position in strain (1–4)
 - —By composer
 - —By strain (A–D)

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Corpus and Methodology





- Musicologists agree these "big three" composers best exemplify the ragtime genre.
- Classical ragtime form: A sequence of sixteen-measure strains, made up of four-measure phrases.

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Example: Joplin "The Nonpareil" Form



Scott Joplin The Nonpareil A Rag and Two Step

NOTICE: Do not play this piece fast. It is never right to play "Ragtime" fast. Author

















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Our Corpus

- 71 compositions:
 - 31 by Joplin
 - 28 by Scott
 - 12 by Lamb
- All for solo piano, duple meter, with clearly-defined sixteen measure strains.
- Used IMSLP for to locate scores, and labeled the strains "A," "B," "C," etc.

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Data representation

- Used binary onset patterns to illustrate the rhythm of the right-hand part.
- Ones represent note onsets, and zeroes represent the absence of an onset (a rest or a tie).

A strain



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The Hadamard transform

- Converts a vector of length 2^{*n*} into another vector of the same length.
- The original vector can be recovered by multiplying by the Hadamard matrix.







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The Hadamard transform

• Divides rhythmic information up by level



Cardinality (note count) Level 1 (sixteenth-note)

Level 2 (eighth-note)

Level 3 (quarter-note)

Positive: on-beat Negative: off-beat

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Example: Joplin "The Nonpareil" Hadamard transform of initial phrases







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B strain



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More notes in later two measures

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C strain





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Hadamard Vector:

Repetition in measures 2-4 (contrast of m. 1 to others)

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Results by position of phrase in strain

Absolute value: Activity (positive or negative) in coefficient Bias: Consistency with which coefficient is positive or negative



Results by composer (position 1, 3 only)



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Conclusions

- The Hadamard transform is a *lossless linear transformation* of rhythmic vectors that captures concepts of *binary metrical level* and a *generalized concept of syncopation*.
- Variations of *tresillo/cinquillo* rhythms load on Hadamard coefficient 7, and are especially distinctive of ragtime.
- Ragtime syncopation mostly appears at the *eighth-note level*.
- The Hadamard transform detects cadential rhythm.
- Joplin is more varied in use of rhythm, Scott and Lamb more consistent.
- There are typical patterns of development over A–D strains, especially focused on the manipulation of tresillo-like rhythms.

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