

Logic & Rhetoric

Mathematical Foundations Lecture Series Part II

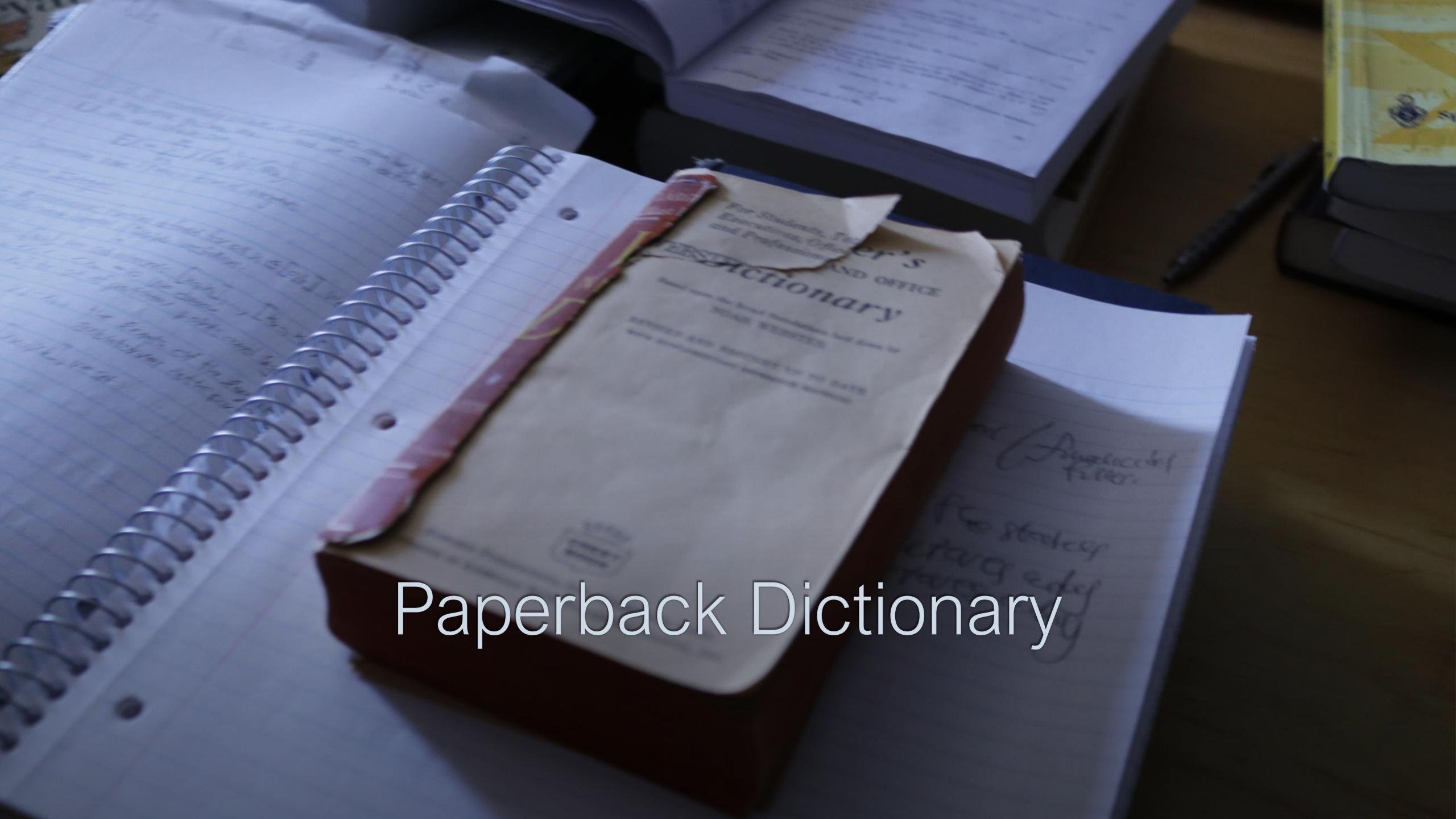
09/22/20

Sava Spasojevic

Rhetoric

- ❖ Rhetoric - the art of speaking, or writing, with elegance and force; declamation; showy oratory. - Webster's Dictionary (1965).

Paperback Dictionary





Elocution

The art, manner, or style of speaking in public; delivery

- ❖ “Painting depicting a lecture in a knight academy, painted by Pieter Isaacsz or Reinhold Timm for Rosenborg Castle as part of a series of seven paintings depicting the seven independent arts. This painting illustrates rhetoric.”



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RHETORICAL DEVICE rhetoric

Alliteration: Alliteration is a word used or written by repeating the first letter of words in a sentence or phrase. It's often used in advertising to make a product sound more appealing.

Allusion: Every time you make a reference to another work, place, event, or a person you're making an allusion. E.g. I'm not Sherlock Holmes that out.

Anaphora: Simile: Paradox: Personification: Synecdoche: Hyperbole: Metaphor: Irony: Allegory: Oxymoron: Assonance: Chiasmus: Anadiplosis: Antithesis: Antanaclasis: Antiphrasis: Antonomasia:

RHETORICAL DEVICES **ETORICAL DEVICE**

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Rhetorical device

In rhetoric, a rhetorical device, persuasive device, or stylistic device is a technique that an author or speaker uses to convey to the listener or reader a meaning with the goal of persuading them ...

Wikipedia

Feedback

What Is a Rhetorical Device and Why are They Used?

- [alliteration](#) | see definition» ...
- [anacoluthon](#) | see definition» ...
- [anadiplosis](#) | see definition» ...
- [analepsis](#) | see definition» ...
- [anaphora](#) | see definition» ...
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31 Common Rhetorical Devices and Examples | Merriam ... ✓

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What are examples of rhetorical devices? ▾

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Ethos

- ❖ For Aristotle, a speaker's ethos was a rhetorical strategy employed by an orator whose purpose was to "inspire trust in his audience"
- ❖ Too much variability in position can cause a dissolution of ethos.



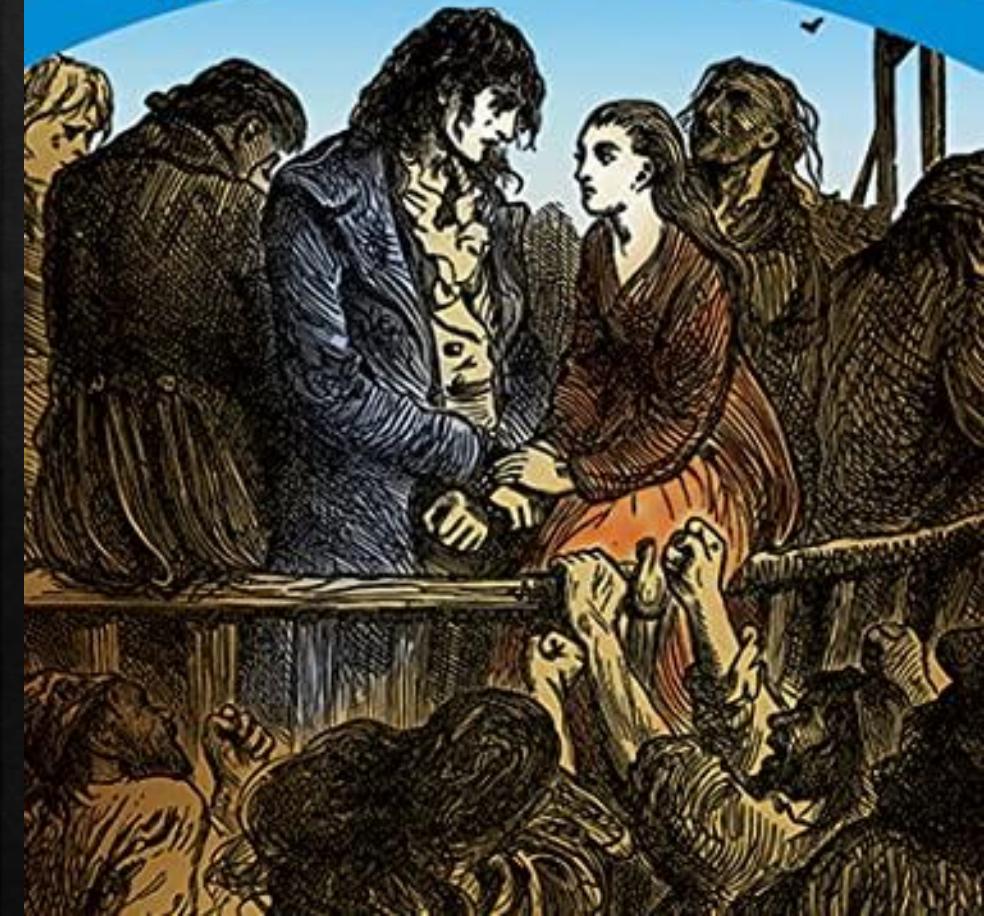
Pathos

An expression of deep feeling; that which excites mental emotions.

Charles Dickens

A TALE OF TWO CITIES

DOVER THRIFT EDITIONS



Logos

- ❖ Pertaining to logic
- ❖ Logic is the science of correct reasoning; the laws which govern correct thinking.



Subtle Differences in Language Create Marked Differences in Rhetorical Appeal

Funding

❖ Ethos



Donations

❖ Pathos



Basic Definitions

Statement

Sentential connective

Conjunction

Implication

Tautology

Proposition

Statement

- ❖ The language of mathematics consists primarily of declarative statements.
- ❖ A statement is a sentence that has a truth value, namely true or false.
- ❖ The act of stating; that which is stated; narrative or recital.



Statement:

“Men take steps,
jets take flight.”

True or False?



True!

Notation

- ❖ We will denote statements with the letters p and q from now on to simplify notation.
- ❖ p = Bruins are the best in the world.
- ❖ q = Bruins are not the best in the world.
- ❖ Clearly p is true and q is a blatant falsehood.

Sentential Connectives

- ❖ Not (negation)
- ❖ And
- ❖ Or
- ❖ If p
- ❖ Then q
- ❖ p if and only if q

	<i>Symbol</i>	<i>Meaning</i>
Negation	\sim	NOT
Conjunction	\wedge	AND
Disjunction	\vee	OR
Conditional	\rightarrow	If/Then
Biconditional	\leftrightarrow	IF and ONLY IF

Essential Truth Table

P	Q	$\neg P$	$P \wedge Q$	$P \vee Q$	$P \rightarrow Q$	$P \leftrightarrow Q$
T	T	F	T	T	T	T
T	F	F	F	T	F	F
F	T	T	F	T	T	F
F	F	T	F	F	T	T



Insight Into the Implication

“If p, then q” is an implication or a conditional statement.

The “if” portion is called the *antecedent*.

The “then” portion is called the *consequent*.

Insight Into the Implication

Vacuous truths – the case where the antecedent is false.

Tautology

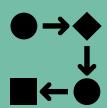
- ❖ Repetition of the same thing or idea in different words; sameness of words or of meaning.
- ❖ A tautology is a formula whose negation is unsatisfiable.
- ❖ To be or not to be.



Proposition



On offer of terms; proposal; a complete sentence, or one that affirms or denies something; a theorem or problem for a solution.



Example: The distribution of a scaled random walk converges to the normal distribution in the limit.

Veracity

n. Truthfulness, truth.

“I am trying to
ascertain the veracity
of his proposition.”

\forall

\exists

Quantifiers

- ❖ “For all” – the universal quantifier.
- ❖ “There Exists” – the existential quantifier.
- ❖ Example: For all integers there exists an additive inverse.

Do Some Logic Puzzles