

Fixing the most representative  
physicochemical and biological  
variables of Medellín's Parque Norte  
lake, as a basis for a math modeling of  
the bioremediation

Oral progress report

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# Agenda for today

1. Introduction
2. Research practice goals
3. Progress
  - 3.1. Knowledge appropriation
  - 3.2. Selecting quantitative data that describe aquatic ecosystems from previous research
  - 3.3. Synthesizing selected data

# 1. Introduction



Taken from: Wikipedia

# 1. Introduction



Taken from: El Colombiano

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# 1. Introduction

# Mathematical Modeling

## 2. Overall goal

Statistically analyzing secondary information relevant to the wetland Parque Norte Lake from Medellin, Antioquia in order to provide basis for studies on bioremediation by mathematical modeling.



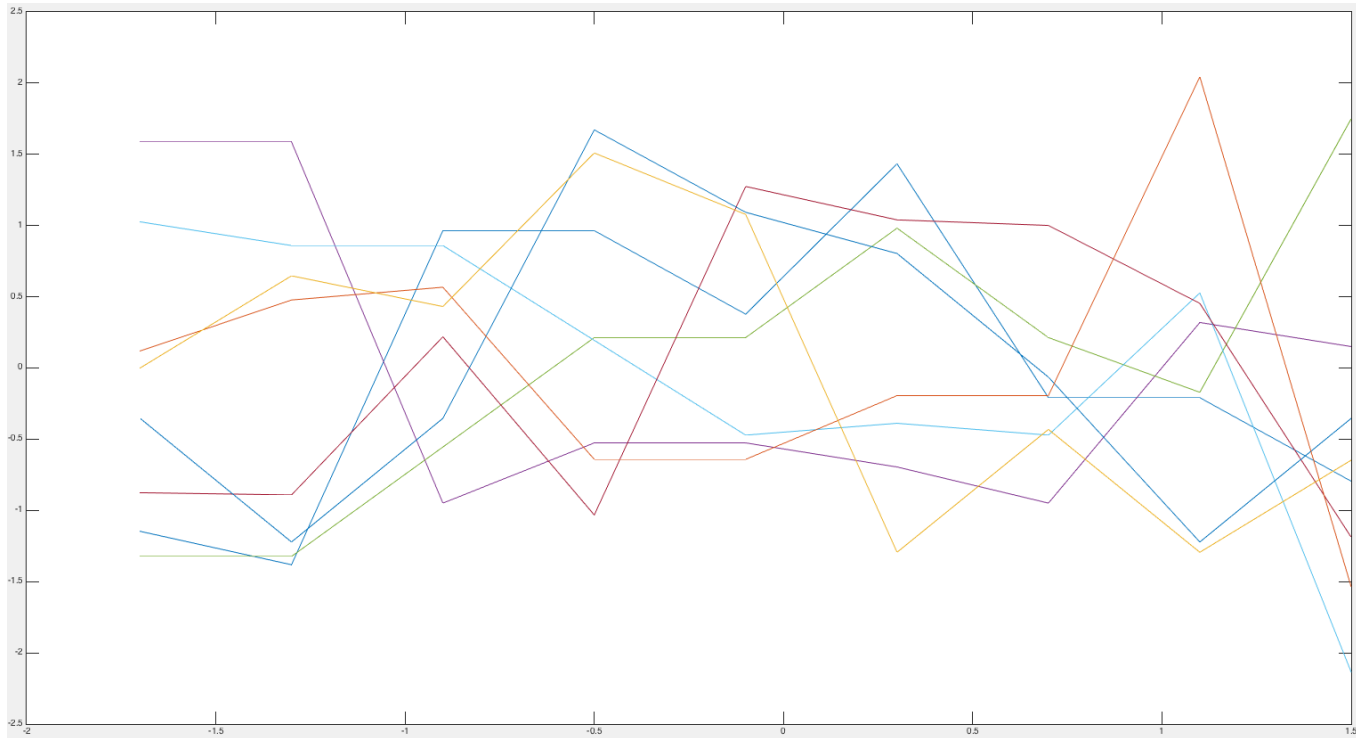
## 2. Specific goals

- To determine the relationship between physical, chemical and biological variables which are the most representative and the key on the ecological functioning of the lake.
- To select appropriate quantitative data describing the aquatic ecosystem from previous research.

## 2. Specific goals

- To suggest significant variables to structure the dynamic model that modulates the ecological functioning of the Parque Norte Lake.

# 3. Progress



Exploratory analysis data

# 3.1. Knowledge appropriation

Limnology definition

Aquatic ecosystem

Water

Structure and performance aquatic ecosystem

Abiotic and biotic factors

Aquatic population and communities dynamics

# 3.1. Knowledge appropriation

## Lakes

Flood lakes

Forms and sizes lakes

## Gases dissolved in the water

Dissolved oxygen and BOD

CO<sub>2</sub> and others gases dissolved in the water

## 3.2. Selecting quantitative data that describe aquatic ecosystem from previous research

### CO<sub>2</sub>, alkalinity and pH System

Photosynthesis and respiration

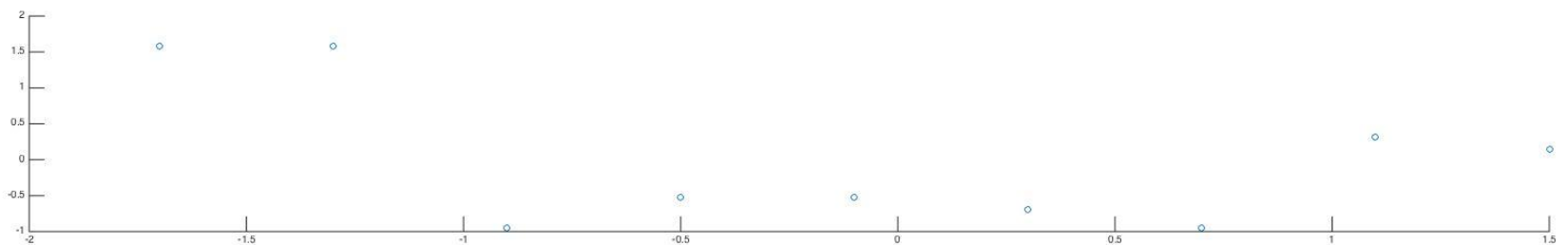
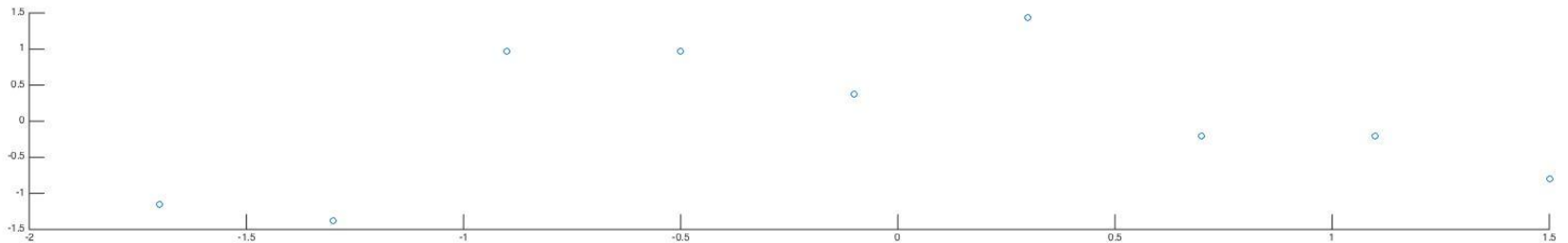
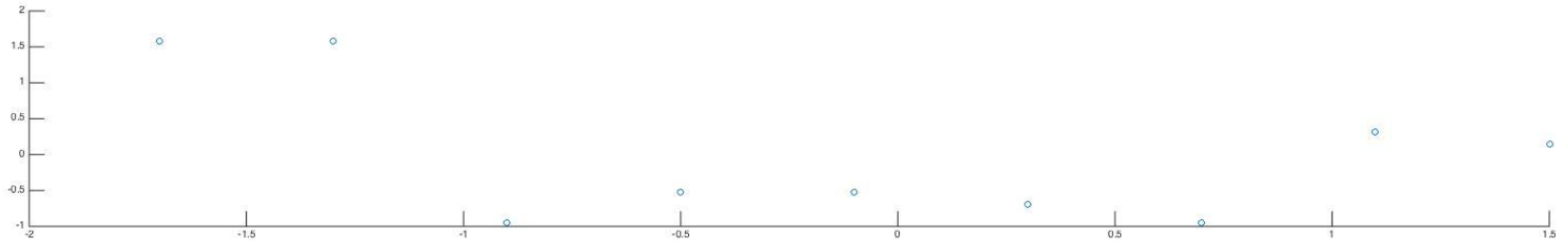
Alkalinity

### Main ions in the natural water

Total dissolved solids and electrical conductivity

Origins and behavior of ions in aquatic ecosystems

# Data Exploratory Analysis

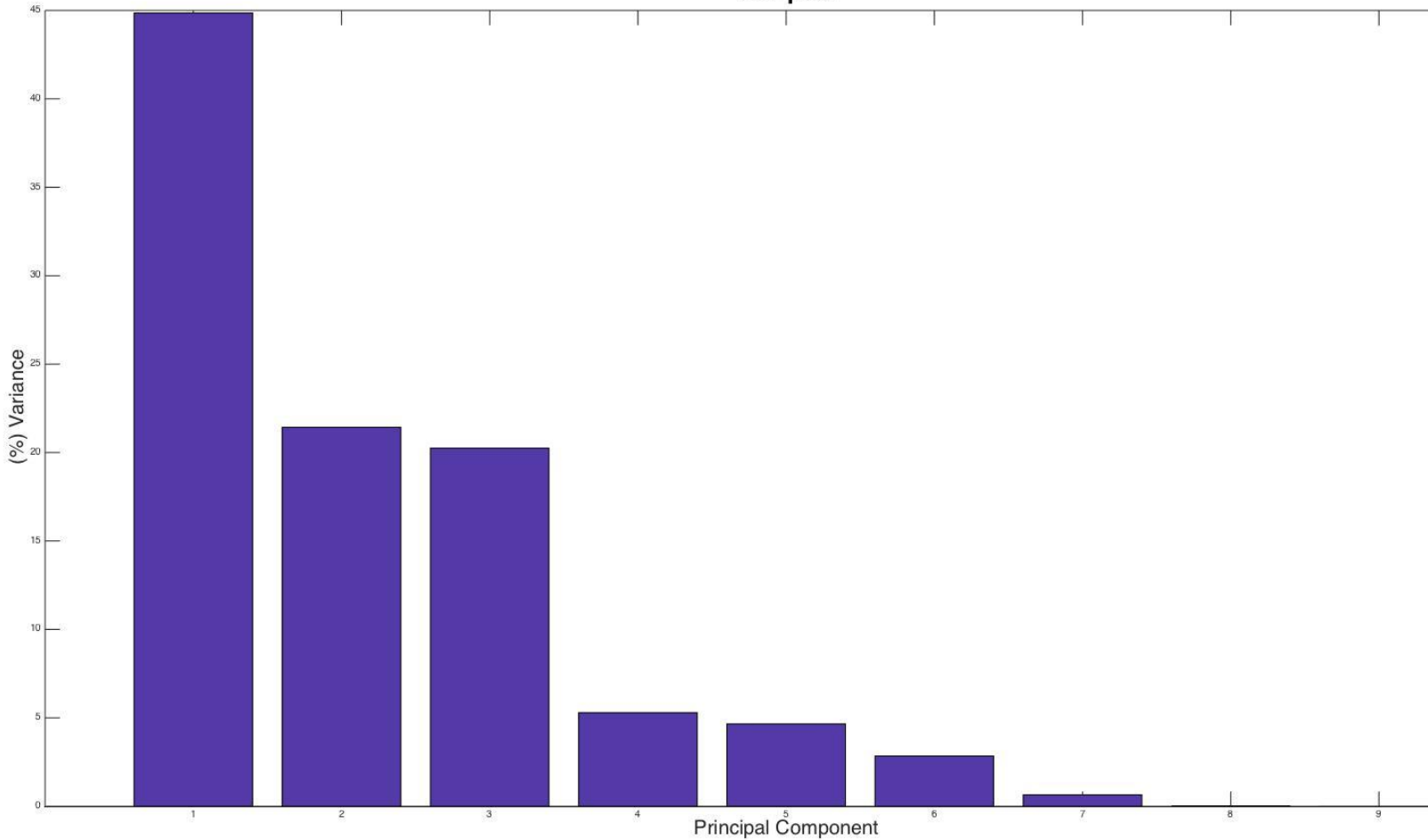


## 3.2. Selecting quantitative data that describe aquatic ecosystem from previous research

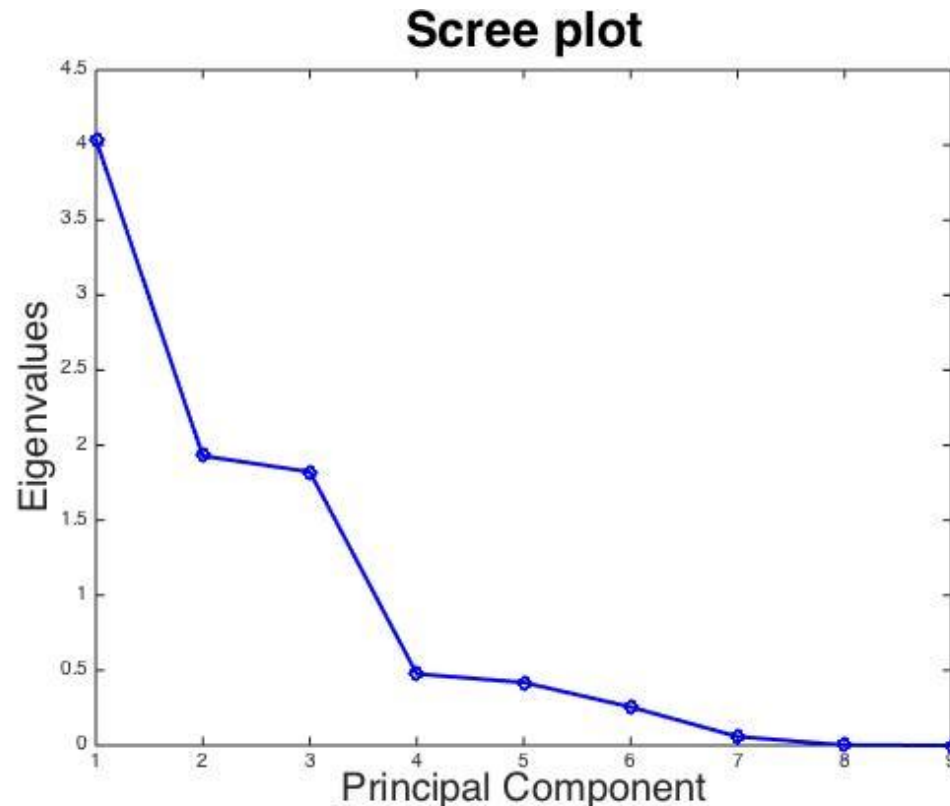
- Standardization
- Eigenvectors and eigenvalues
- PCA- Principal Component Analysis
- Varimax rotation



Bar plot



## 3.2. Selecting quantitative data that describe aquatic ecosystem from previous research



Thanks for your attention

questions?

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