

How to make lectures about mathematics

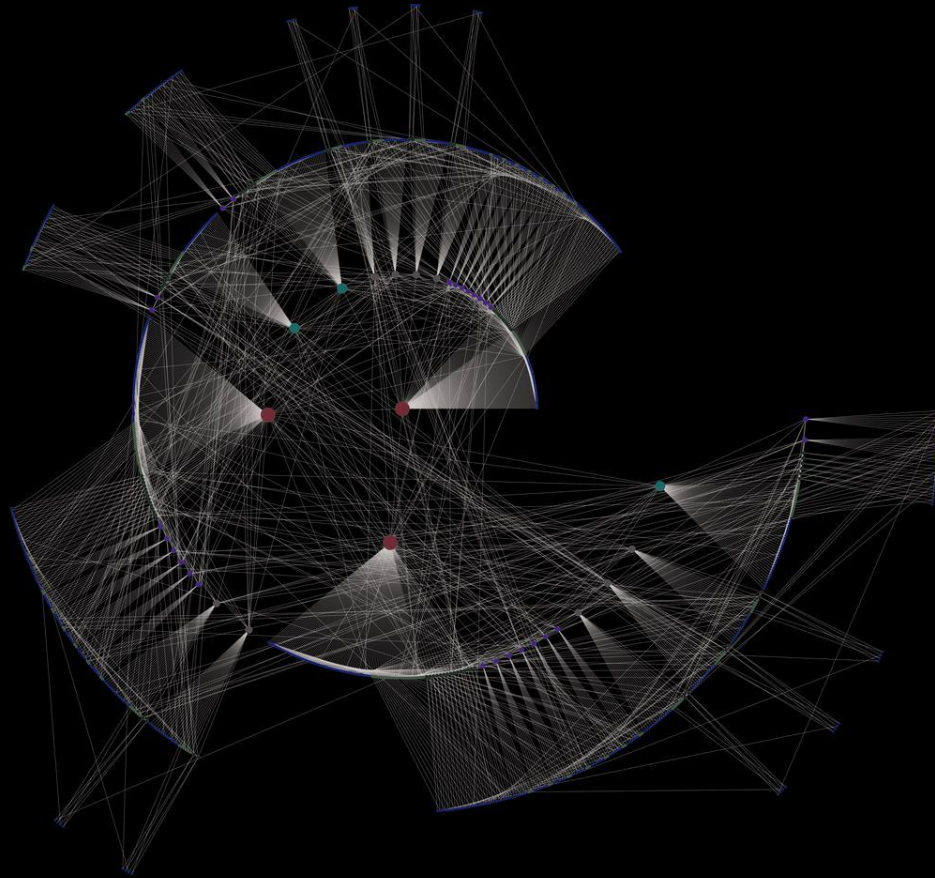
Liubov Tupikina

Lecturers without borders www.scied.network

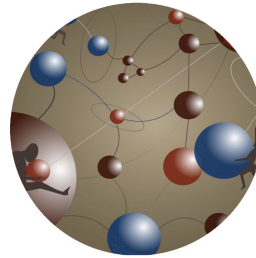
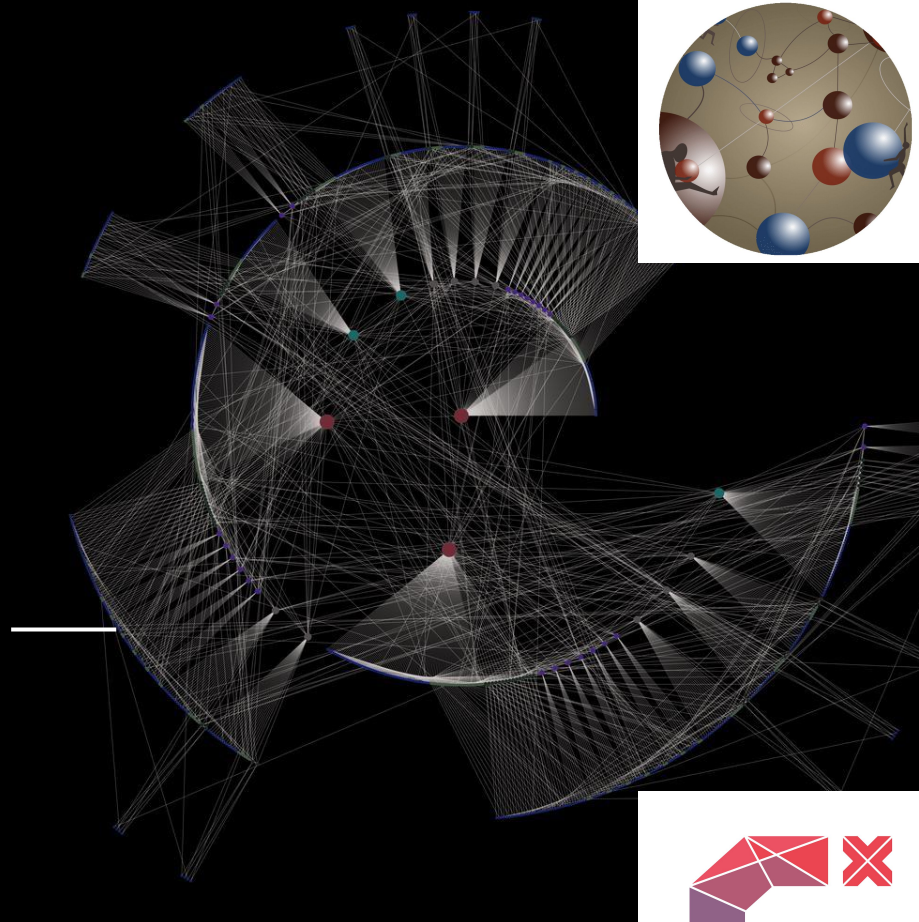
liubov.tupikina@cri-paris.org

<https://twitter.com/luyibov>

About me



<https://sites.google.com/view/liubovkmatematike/>



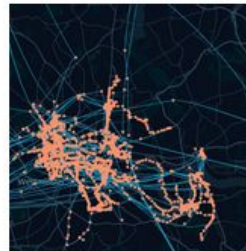
Bikes analysis

Bike mobility project with City lab Berlin data (CEU (Federico Battiston and Luis Natera) - we are planning to work on the project during [Complexity22](#)



Paths in the city

Together with colleagues we analyze shortest paths in the city. Github repository is available at <https://github.com/liubovkmatematike>



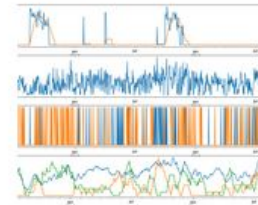
Smart cities

Urban science, mobility of people, sensing citizens. Check and subscribe for [Move in Savoy](#) App



Heterogeneous SIR model

We are finishing the project on heterogeneous SIR model, which we started in 2019 with my student at CRI and P-Holme. More on [github](#) soon.



Patients data analysis

Project together with O.Mirat, B.Greschake (CRI, Openhumans) and CorrelAid Paris



Mobility of researchers

Due to Coronavirus travel bans stopped many travels of scientists, we continue to work on formulating the [revisited](#)

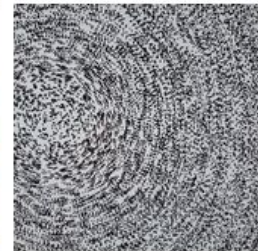
Analyzing open data

We are working on analysis of open data of health from UK with the colleagues, more news and updates soon.



Developing online courses

During Covid19 many schools and universities are closed. Together with [LeWigo](#) we support this and make research open online courses



Network percolation

Project continuation of percolation project together with Ecole Polytechnique: generalisation to porous networks. Latest [article](#) in Sci Rep.

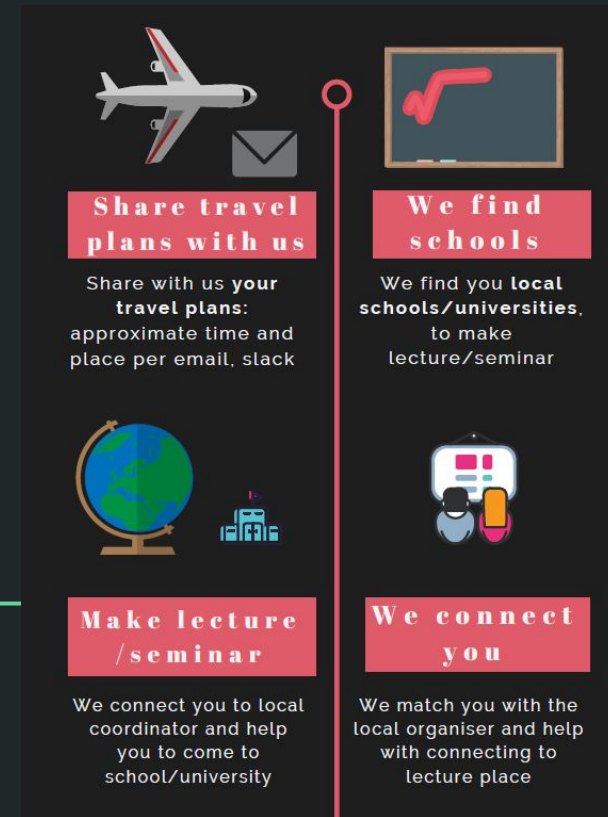


<https://sites.google.com/view/liubovkmatematike/>

Lecturers without borders project

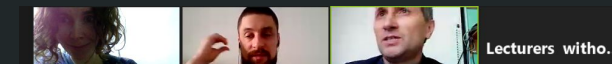
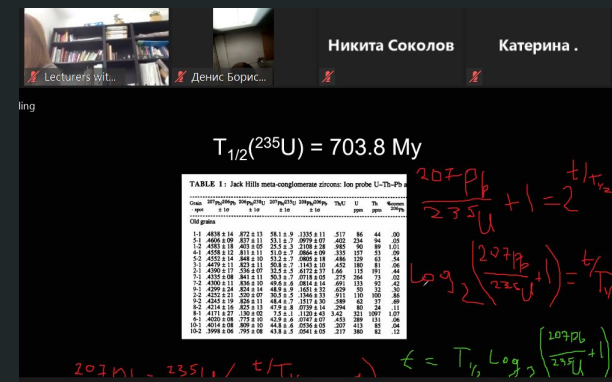
www.scied.network

We link together traveling scientists with
Schools and universities around the globe



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Connect to us:

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Join us!

networkscied@gmail.com



Lecture example

Что мы знаем о движении
муравья? (in Russian)

Любовь Тупикина

liubov.tupikina@cri-paris.org

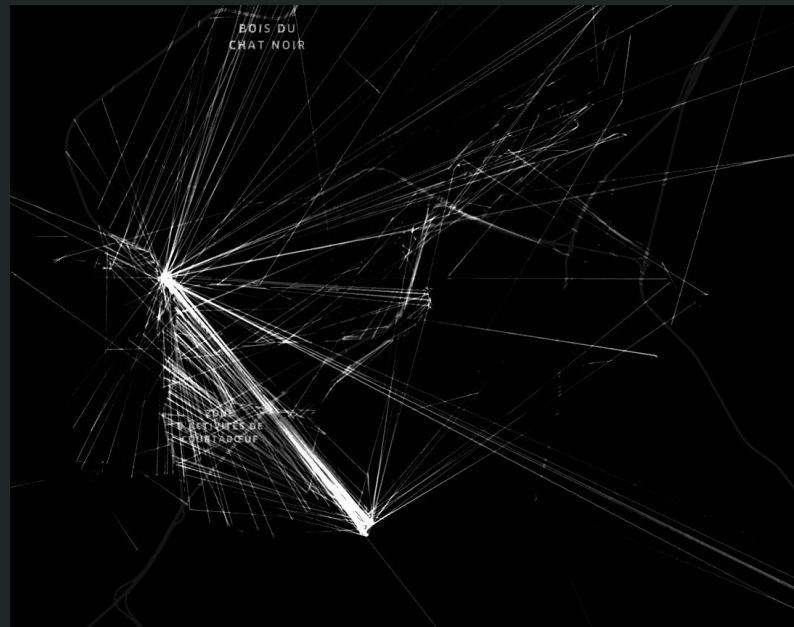
<https://twitter.com/luyibov>

Introduction



Everyone knows this cartoon мультифильм

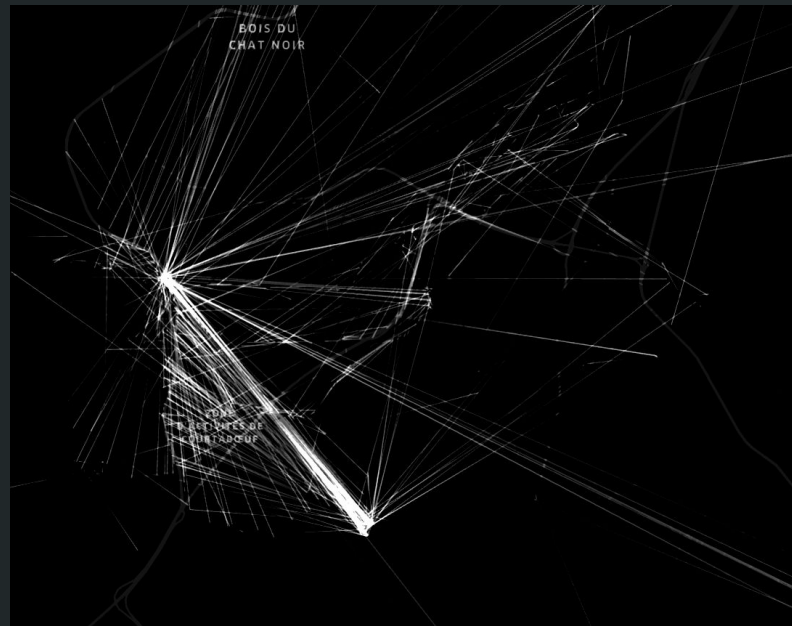
Where is who?



Ant



Person



```

import andi
import numpy as np

#N given = 10 steps
#X1, Y1 = andi_dataset(N_given)

AD = andi.andi_datasets()
datasetCTRW = AD.create_dataset(T = Time, N = 1, exponents = [0.7], models = [1], dimension = 2)
#print(np.round(dataset[0], 2))
#print(type(X1), np.shape(Y1))
print(np.shape(datasetCTRW))
print("trajectory loaded")
plot_trajectory(datasetCTRW[0,2:Time+2],datasetCTRW[0,Time+2:]) # 2D trajectory with first X coordinates, then Y coordinates
print(np.shape((datasetCTRW[0, 2:Time+2])))

```

(1, 1002)

trajectory loaded

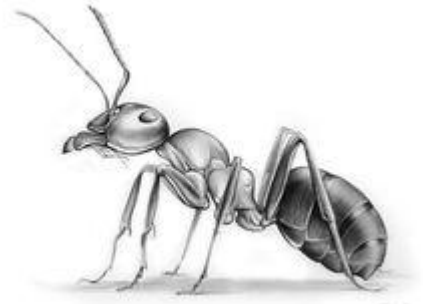
(500,)

Mathematical problem (formulate)

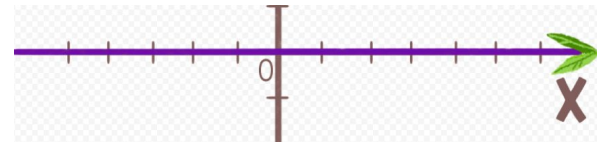
How to describe the
movements of ant?

Ant problem

An ant starts from point 0 and goes to the right and to the left.
We need to find the position of an ant in 5 steps.



(in maths courses use the power of analogy)



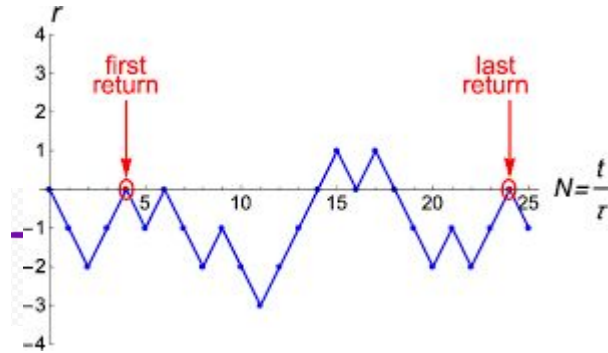
Ant problem



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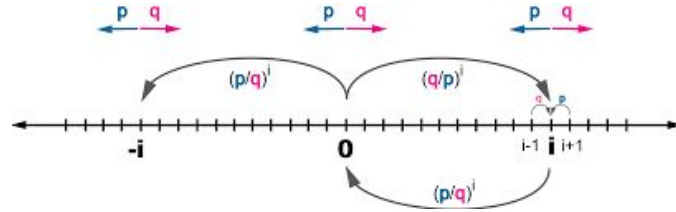
In 1D, not in 2D

Ant problem



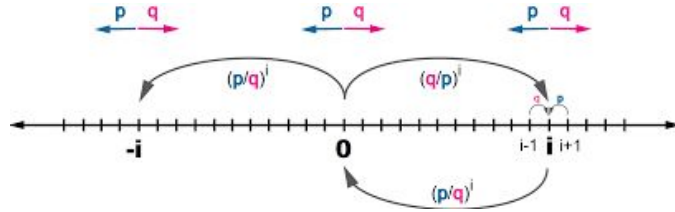
Муравей стартует из 0 и может идти налево или направо.
Надо найти, где будет муравей через 5, 10, N шагов?

Муравьиная задача

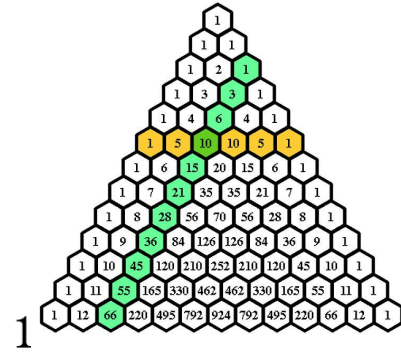


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Муравьиная задача



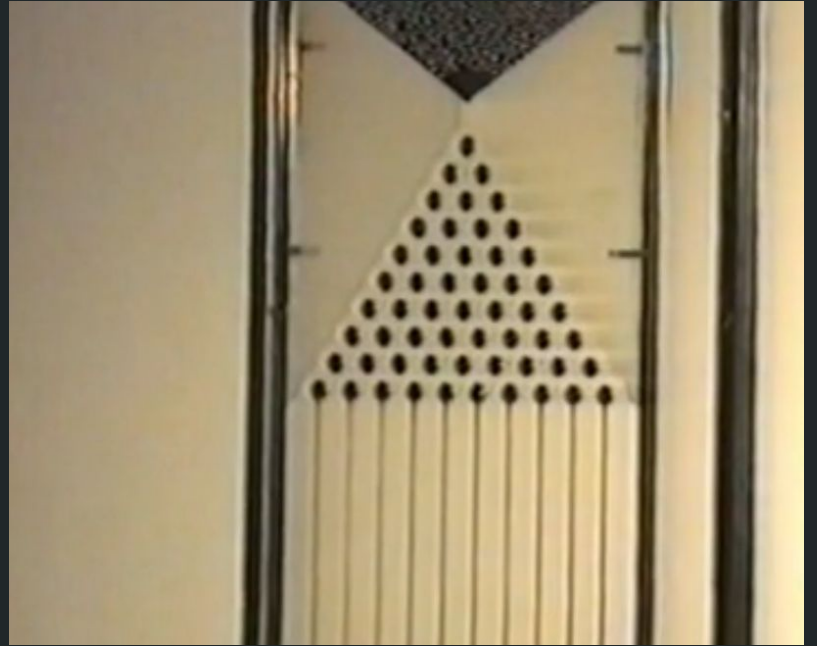
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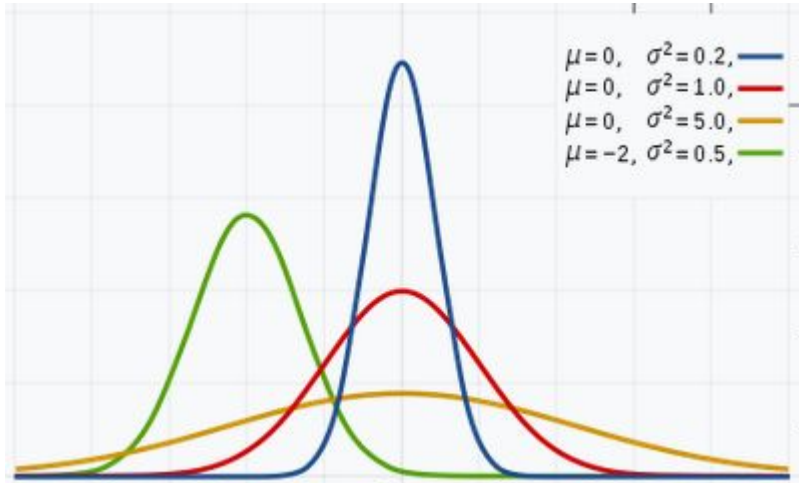
Pascal triangle

Museum door

Halton experiment



Different problem



- What is the form of the distribution?

