Plan for teaching experimentation: stationarity of a stochastic process

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Intended learning outcomes. The target group is a student in the course *MS-C2128 - Prediction and Time Series Analysis*. Preliminaries for the course are some basic mathematics such as differential and integral calculus, linear algebra and basic course in probability and statistics. Thus, I think that even if the group of peers is heterogeneous, they should be able to achieve the intended learning outcomes.

I wish to teach the concept of stationarity of a stochastic process. Rigorous definitions are shown, but more importantly, I wish that after the session students can recognize a stationary stochastic process when they see one. The learning outcome is formulated in the following way:

- After the session the student can recognize visually if a stochastic process is stationary.

Teaching methods First, there is a presentation (lecture). I start by figuring out the background knowledge of each student by asking some questions like

- Do you know what is a random variable?
- Do you know what is a stochastic process?
- Do you know what stationarity means in the context of stochastic processes?

Then I lecture. I use either blackboard or slides or maybe even both when lecturing. The purpose is to give definitions and discuss them shortly. Hopefully, the lecture will be more like a discussion with students, and I

can activate students enough during the lecture. So actually the "lecture" is a combination of a traditional lecture and a teaching discussion.

After the lecture, there is some kind of assignment for students. I have not decided yet what it is exactly, but I hope to code something with R so that students can do the assignment with their laptops.

Motivation behind the teaching methods. Firstly, the motivation for lecture/discussion is that I have to somehow introduce the concepts to the students. Secondly, the motivation for the assignment is that students get to know in practice if they understand what is being taught. Also, the assignment gives a possibility to correct misunderstandings if there are any.

Assessment. The assignment should work as an assessment. If this was not an experiment I would like to know how students did. However, I am not yet sure if I want to somehow collect the results of the assignment or if it is even practically possible.

Timeline. While preparing the lecture and the assignment I have to take into account that discussion (hopefully) takes some time and most probably it takes some time to open the assignment on laptops.

- 10min for lecturing/discussion.
- 10min for assignment.