

# **Branching stochastic processes as models of Covid-19 epidemic development**

**Var123 - week 53**

**N. Yanev, V. Stoimenova, D. Atanasov**

---

## **Branching stochastic processes as models of Covid-19 epidemic development : Var123 - week 53**

### **Abstract**

The results presented here are obtained using the methodology proposed in the paper <https://arxiv.org/abs/2004.14838> for the country Var123. The data comes from European Centre for Disease Prevention and Control available at <https://opendata.ecdc.europa.eu/covid19/casedistribution/csv>.

---

## Table of Contents

1. Observed Infection data .....	1
2. Estimating of the main parameter and some predictions .....	3

---

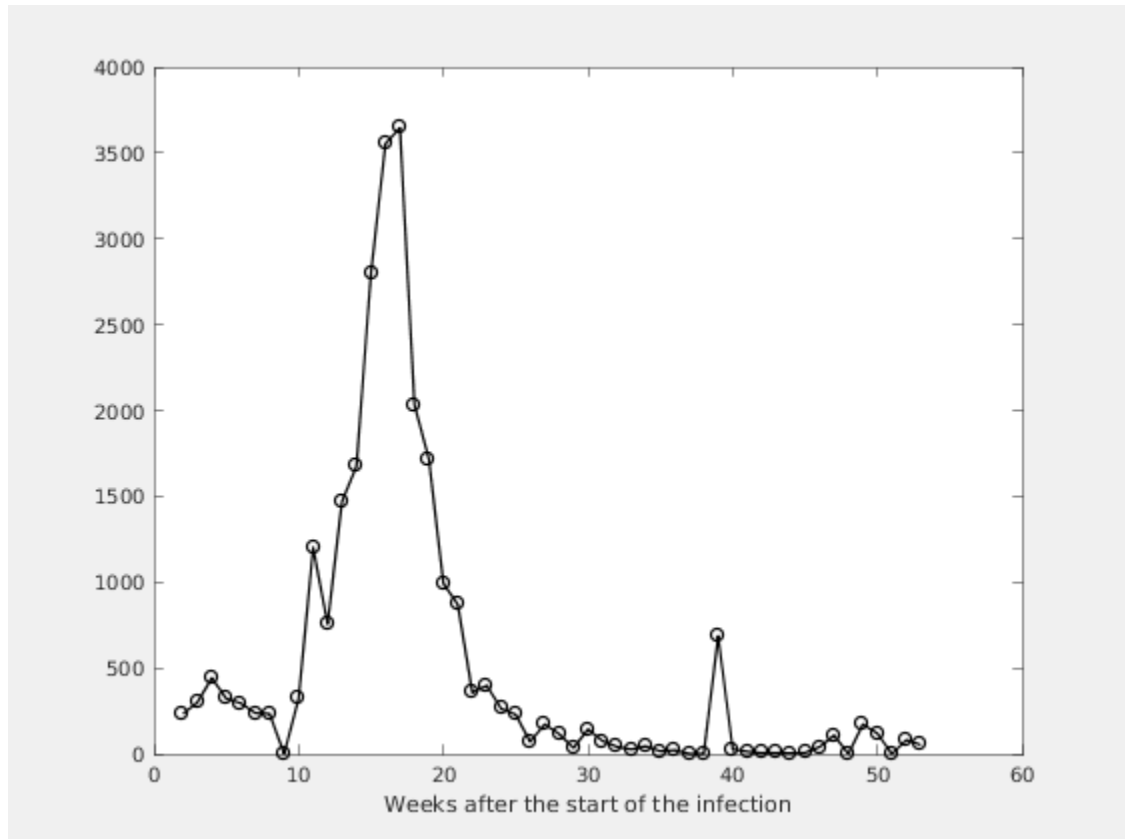
## List of Figures

1.1. Number of the weekly reported laboratory-confirmed cases .....	1
1.2. Number of the total registered cases .....	2
2.1. The Lotka-Nagaev and the Harris type estimator of the growth rate .....	3
2.2. Figure .....	4
2.3. Expected number of the nonregistered infected individuals without immigra- tion .....	5
2.4. Expected number of the nonregistered infected individuals with immigration .....	6

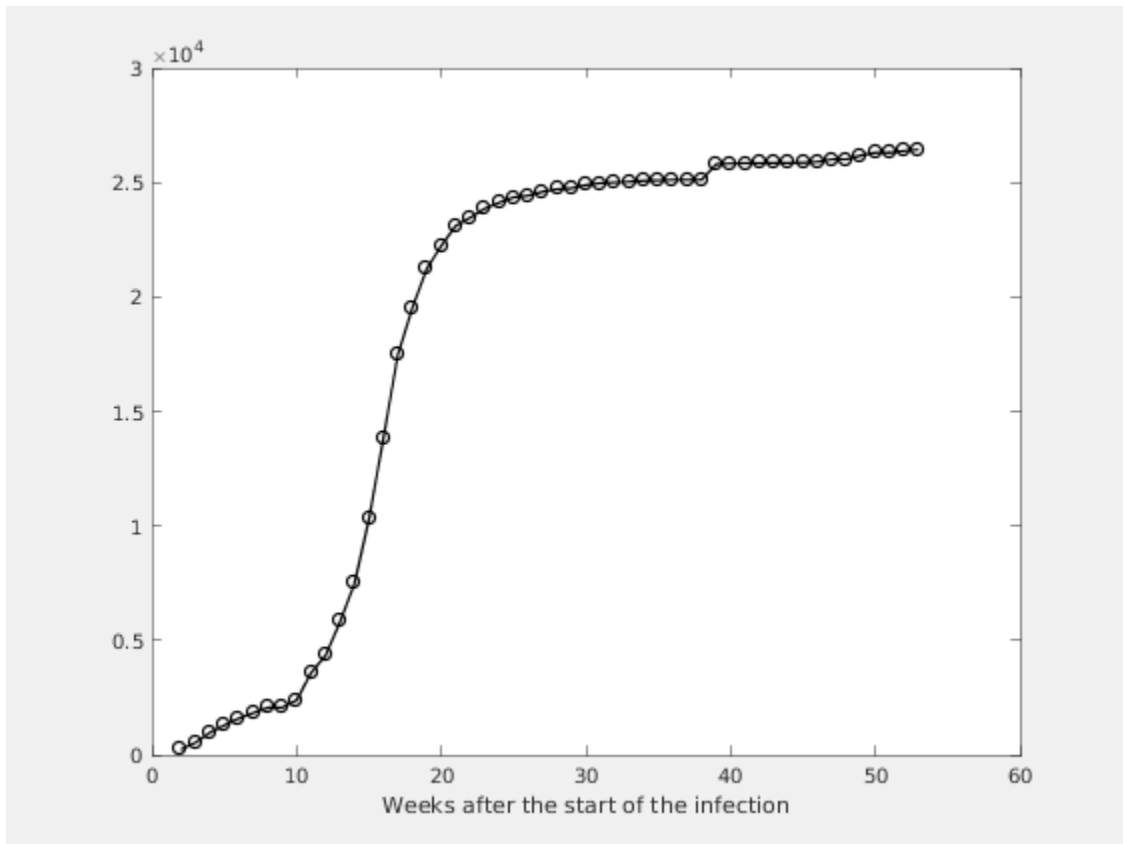
---

# Chapter 1. Observed Infection data

Figure 1.1. Number of the weekly reported laboratory-confirmed cases



**Figure 1.2. Number of the total registered cases**



---

# Chapter 2. Estimating of the main parameter and some predictions

Figure 2.1. The Lotka-Nagaev and the Harris type estimator of the growth rate

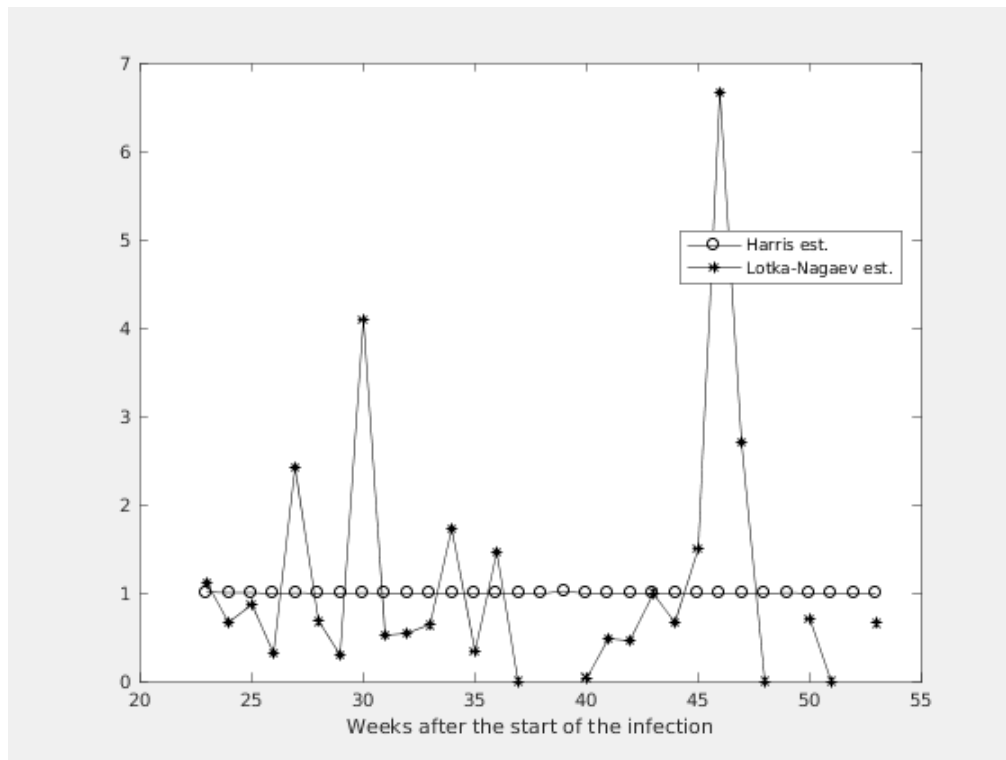
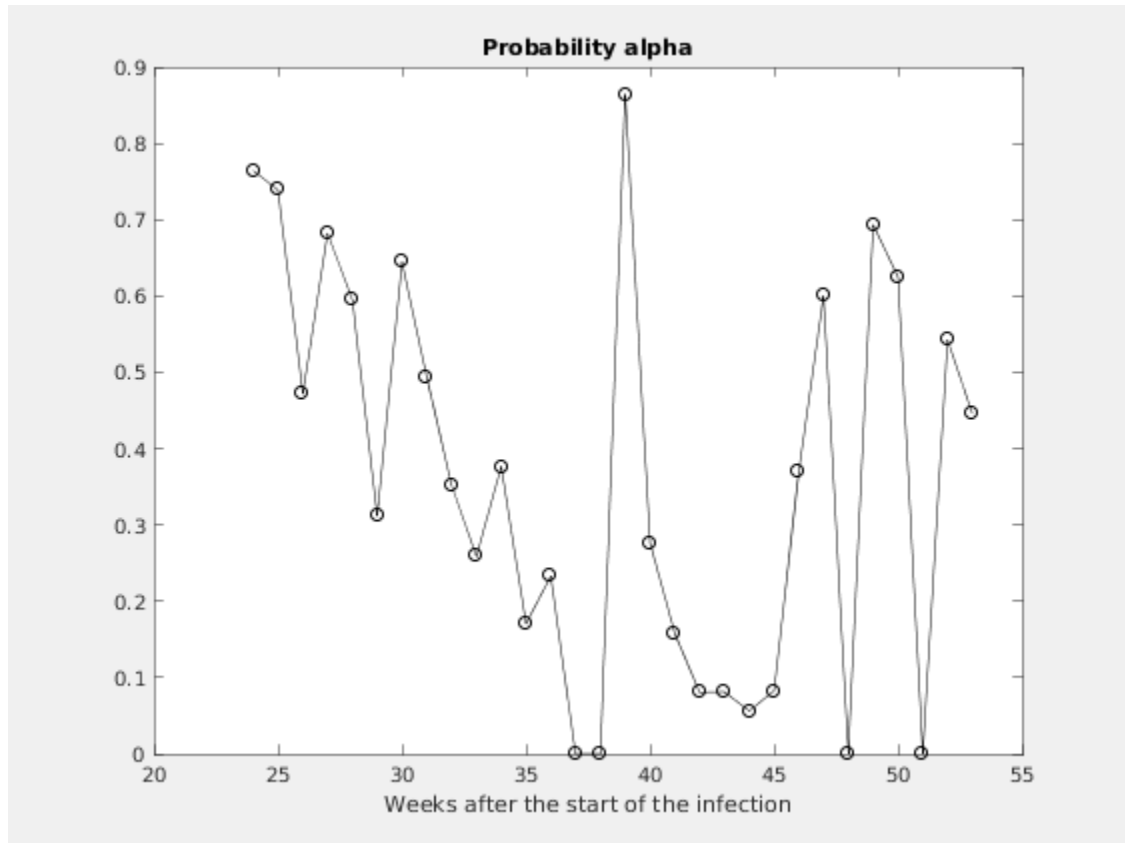
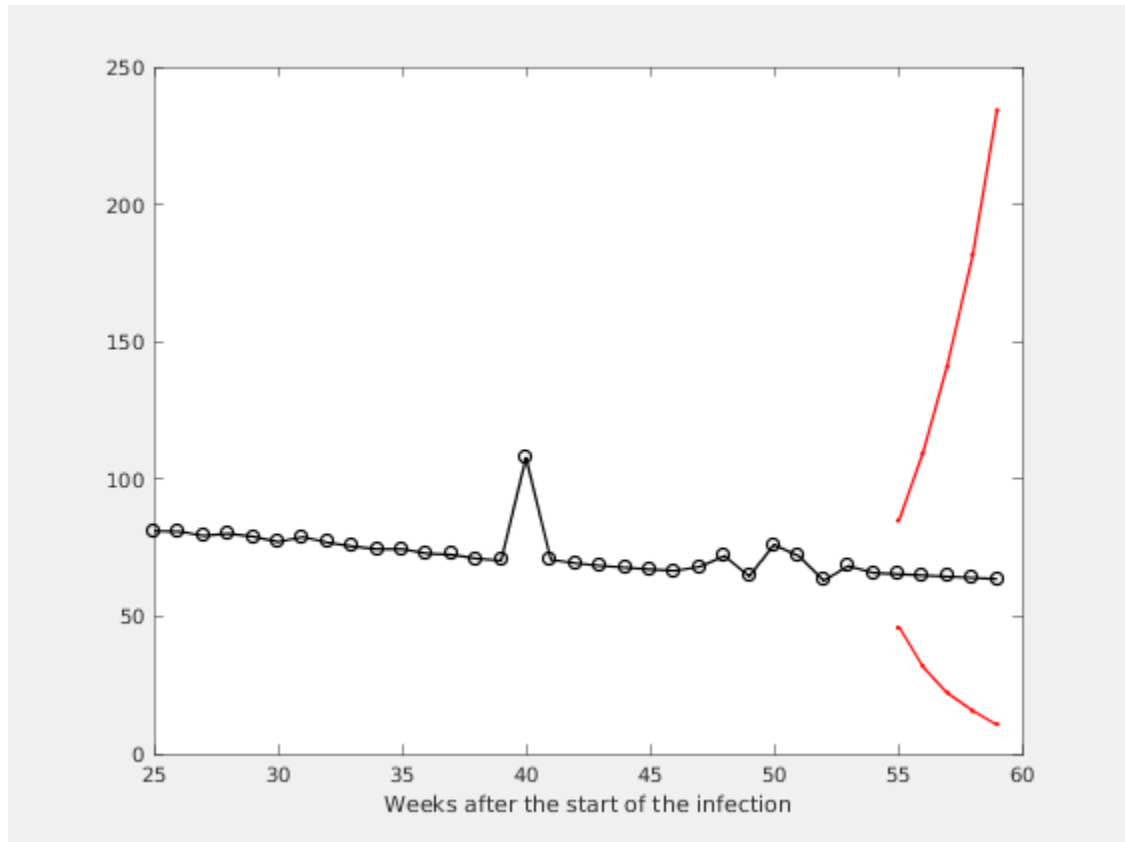


Figure 2.2. Figure

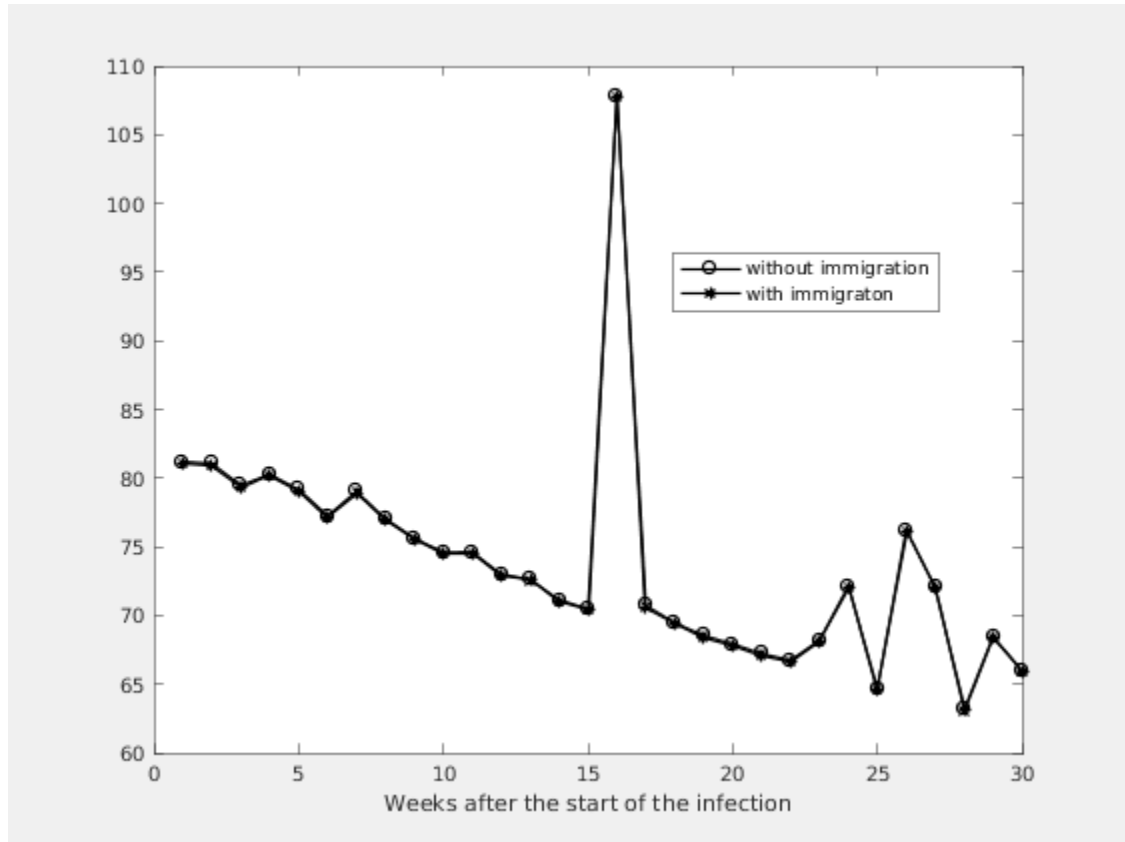




**Figure 2.3. Expected number of the nonregistered infected individuals without immigration**



**Figure 2.4. Expected number of the nonregistered infected individuals with immigration**



**Estimation of the model parameters.**

k	m	ci	alpha	A1	M1
4	0.9976	0.6857 - 1.3095	0.5998	72	72
3	0.9956	0.6844 - 1.3069	0.0000	65	65
2	0.9911	0.6833 - 1.2989	0.6932	76	76
1	0.9942	0.6908 - 1.2976	0.6250	72	72
0	0.9931	0.6905 - 1.2958	0.0000	63	63