

(Manuscript title) Analysis of Gause Experimental Time Series by Means of Continuous- Time Models

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Abstract Style: Article Body, Font: Bold.

Purpose: The abstract should state briefly the purpose of the research, methodology, the principal results and major conclusions. Write concisely

Key words: Sample key words (Capitalize every first letter)

Introduction (and other possible Chapters of publication)

Description of model

Analysis of model

Used datasets

Discussion

Conclusion

Acknowledgements
References

Basic rules for Article

1. Terminology and Formulae

Manuscript should use the standard mathematical notation for formulae, symbols etc.:

$$\frac{dy}{dx} = F(y, x, a) \quad (1)$$

Let x_1, x_2, \dots, x_N be an initial time series, N is number of years (sample size), and x_k is a population density at k -th year. For every sub-sample of the type $x_r, x_{r+1}, \dots, x_{r+m}, r, m \geq 1, r + m \leq N$ (we put $m = 11$ for every analyzed sub-sample) the values of Kostitzin model (1) parameters $a^* = a^*(r), b^* = b^*(r),$ and $y_1^* = y_1^*(r)$ were estimated with the following condition:

$$Q(r, m, a^*, b^*, y_1^*) = \min_{a, b, y_1} \sum_{j=r}^{r+m} (x_j - f(j, a, b, y_1))^2, \quad (2)$$

2. Figures

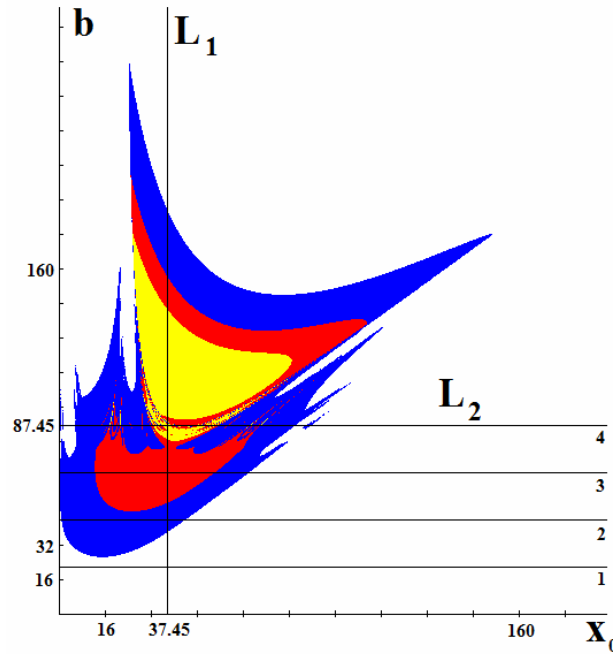


Fig. 1. Section of confidence domains by the plane $a = 0.0457$. 1, 2, 3, 4 are the bifurcation lines $ab = 1, ab = 2, ab = 3$ and $ab = 4$ respectively. Domain with yellow color corresponds to 90% confidence domain. Domain with yellow and red colors together corresponds to 95% confidence domain. Domain with yellow, red, and blue colors together corresponds to 99% confidence domain. Intersection of strait lines L_1 and L_2 gives the point of global minimum of the functional form Q .

3. Tables

Table 1. Estimations of model parameter's values and respective value of minimizing functional (for first ten values of time series)

Models	Estimations of model parameters			Functional Q_{\min}
	x_0	a	b	
Results for the first sample (GPDD N 2727)				
1	72.92	0.87	$7.47 \cdot 10^{-20}$	10016.2
2	37.45	$4.57 \cdot 10^{-2}$	87.45	5403.4
3	72.92	873542022.06	$9.97 \cdot 10^{-10}$	10016.2
4	72.92	0.87	$5.14 \cdot 10^{-17}$	10016.2
5	34.49	5970.72	0.21	4003.4
Results for the second sample (GPDD N 2728)				
1	7.7	122484166054.27	15614128777.97	414.1
2	6.04	0.25	17.07	66.6
3	12.27	87332408.73	$1.03 \cdot 10^{-8}$	347.1
4	12.27	0.9	$2.4 \cdot 10^{-16}$	347.1
5	6.4	137665.77	1.65	105.8
Results for the third sample (GPDD N 2729)				
1	5.33	1.1	0.13	8.3
2	3.38	2.31	3.87	9.6
3	5.35	4.93	0.22	8.2
4	5.24	1.02	0.26	8.6
5	5.37	1.06	0.098	8.2