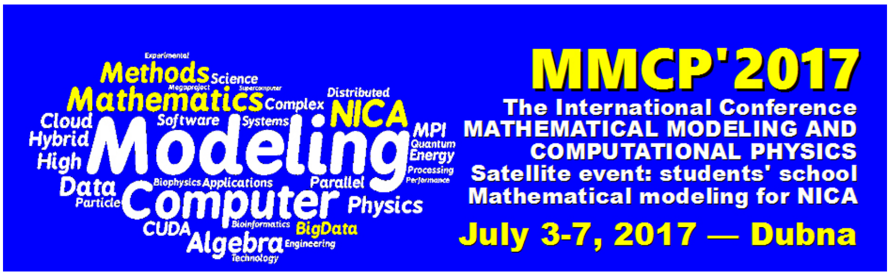

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Analitical solution for Experimental Data Approximation by Solving Linear Difference Equations with Constant Coefficients.

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This paper proposes an analitical method for approximating experimental data points X*(j) by the curves representing the solutions of linear difference equations with constant coefficients, in particular, by the curves of the exp*cos class (for the second-order equation - in form of
X(j) = c1 • X(j −1) + c2 • X(j −2) + b).
As for coeffitients of such approximation (c1, c2 and b) - they can be calculated as a solution of system equations just the same as Yule–Walker system of equations. To find the initial conditions (X0 and X1) it is nessesary to solve the system of two linear equations based on recurrently calculated values A(j), B(j) and C(j):
For j=0 A(0) = 0, B(0) = 1, C(0) = 0;
For j = 1, A(1) = 1, B(1) = 0, C(1)=0; and for j>=2 as:
A(j + 1) = c1 • A(j) + c2 • A(j −1) ;
B(j + 1) = c1 • B(j) + c2 • B(j −1) ;
C(j + 1) = c1 • C(j) + c2 • C(j −1) + b; where c1, c2 and b - primarely finded coeffitients (solution of system of Yule–Walker type).
The proposed approach minimizes the root mean square (RMS) deviation. The analysis of two possible sources of noncorrect behaviour of approximating curve was done. The method is tested on some examples.

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