## Comparative analysis of fast merging algorithms for iterative polygonal approximation of contour chains with various optimization criteria

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## Abstract:

The article examines the properties of fast merging algorithms that are used for iterative polygonal approximation of contour chains and differ in optimization criteria. The optimization criteria under study are the perimeter maximum, the minimum of maximum and root-mean-square error. The algorithms are compared in terms of preference for localization of angles, by numerical criteria (perimeter length, maximum and mean square error) and computational complexity.

<u>Keywords</u>: Polygonal Approximation of Contour Chains, properties of fast merging, algorithms, mean square error.

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## Access full text (in Russian)

## References:

- [1] Khmelev RV. Iterative approximation of sequences along the maximum of the perimeter and using the triangle inequality. Computer Optics 2005; 27: 155-164.
- [2] Leu J-G, Chen L. Polygonal approximation of 2-D shapes through boundary merging. Patt Recogn Lett 1988; 7(4): 231-238. DOI: 10.1016/0167-8655(88)90107-9.
- [3] Ku KM, Chiu KM. Polygonal approximation of digital curve by graduate iterative merging. Electron Lett 1995; 31: 444-446. DOI: 10.1049/el:19950319.
- [4] Fahn C-S, Wang J-F, Lee J-Y. An adaptive reduction procedure for the piecewise linear approximation of digitized curves. IEEE Trans Pattern Anal Machine Intelligence 1989; 11(9): 967-973. DOI: 10.1109/34.35499.
- [5] Wu J-S, Leou J-J. New polygonal approximation schemes for object shape representation. Pattern Recogn 1993; 26(4): 471-484. DOI: 10.1016/0031-3203(93)90103-4.
- [6] Boxer L, Chang C-S, Miller R, Rau-Chaplin A. Polygonal approximation by boundary reduction. Pattern Recogn Lett 1993; 14(2): 111-119. DOI: 10.1016/0167-8655(93)90084-Q.
- [7] Visvalingam M, Whyatt J. Line generalization by repeated elimination of points. Cartogr J 1993; 30(1): 46-51. DOI: 10.1179/000870493786962263.
- [8] Pikaz A, Dinstein I. An algorithm for polygonal approximation based on iterative point elimination. Pattern Recogn Lett 1995; 16(6): 557-563. DOI: 10.1016/0167-8655(95)80001-A.
- [9] Horst JA, Beichl I. A simple algorithm for efficient piecewise linear approximation of space curves. Proc Int Conf Image Processing (ICIP'97) 1997; 2: 744-747. DOI: 10.1109/ICIP.1997.638603.