UNIVERSITY OF DEBRECEN
Doctoral School of Informatics

Minor Field of Comprehensive Examination

Mathematical morphology and digital topology

Syllabus

Basic concepts of mathematical morphology, morphological transformations, erosion, dilation, opening, closing, Hit-Miss transformation, duality.
Morphological operations, thinning, thickening, skeletonization, middle axis transformation, convex hull, contour extraction, Golay-alphabet, homotopy, Euler number. Grayscale morphology.
Elements of digital topology, neighborhood structures, connectivity, distance transformations, chamfer techniques, approximations of the Euclidean metrics, grid types.
Digitization, linearity check, digital curves, Jordan condition, curvature.

Bibliography

1. J. Serra: Image Analysis and Mathematical Morphology, Academic Press, 1983.
2. K. Voss: Discrete Images, Objects, and Functions in Z^n, Springer, 1993.
3. R. Klette, A. Rosenfeld: Digital Geometry: Geometric Methods for Digital Image Analysis, Morgan Kaufmann, 2004.
4. R. C. Gonzalez, R. E: Woods: Digital Image Processing, Prentice Hall, 2008.
5. R. C. Gonzalez, R. E: Woods, S. L. Eddins: Digital Image Processing Using MATLAB, McGraw-Hill Education (Asia), 2011.