Imaging Morphology with LAR *

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Abstract

In this module we aim to implement the four operators of mathematical morphology, i.e. the dilation, erosion, opening and closing operators, by the way of matrix operations representing the linear operators—boundary and coboundary—of LAR. According to the multidimensional character of LAR, our implementation is dimension-independent. In few words, it works as follows: (a) the input is (the coordinate representation of) a chain γ_d; (b) compute its boundary $\partial_d(\gamma)$; (c) extract the chain $\epsilon_{d-2} \subset \partial_d(\gamma)$; (d) take its $(d-1)$-coboundary $\delta_{d-2}\epsilon_{d-2}$; (e) compute $\eta_d := \delta_{d-1}(\delta_{d-2}(\epsilon_{d-2})) \subset C_d$ without performing the final $mod 2$ step on the resulting coordinate vector. It is easy to show that $\eta \equiv (\oplus\gamma_d) - (\ominus\gamma_d)$. The four morphological operators are so computable consequently.

References

[CL13] CVD-Lab, *Linear algebraic representation*, Tech. Report 13-00, Roma Tre University, October 2013.

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