

# Hyperbolic Voronoi Diagrams: Software manual

Frank Nielsen ([Frank.Nielsen@acm.org](mailto:Frank.Nielsen@acm.org))

Richard Nock

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The 32-bit software (exported from [processing.org](http://processing.org) source codes) can be downloaded from:  
<https://www.lix.polytechnique.fr/~nielsen/HVD32bit.zip>

There is no warranty or whatsoever: Use at your own risk. Please note that the software can cause system crash and potentially result in losses. Therefore use at your own risk without any guarantee, and only for research purpose.

When you use this software or use figures/snapshots from this software, please cite those two papers:

- [2]: Visualizing hyperbolic Voronoi diagrams. Symposium on Computational Geometry 2014: 90
- [1]: Hyperbolic Voronoi Diagrams Made Easy. ICCSA Workshops 2010: 74-80

## Key keys

'n'	new data set
's'	save various PNG/PDF modes
'q'	exit
'a'	toggle animation
'c'	toggle color mode
'z'	(re)choose colors
'p'	save points into text files: <code>ptsKlein.txt</code> and <code>ptsPoincare.txt</code>
'b'	load points from the text file <code>ptsPoincare.txt</code> . use a tabulation between $x$ - and $y$ -coordinates <code>0.39513780438483986 -0.08813453715703135</code>
'd'	delete a site
'o'	toggle show origin
'*' or '?'	double card size
'/'	halve card size
'1'	Klein mode
'2'	power diagram mode
'3'	Poincaré mode
'4'	both Klein/Poincaré mode overlay
'5'	upper plane mode
'6'	Euclidean mode...
'8'	projected hyperboloid mode...
'9'	toggle $n = 2$ or $n = 50$ mode
','	point size width halved
','	zooming in PD mode
','	
','	zooming in PD mode

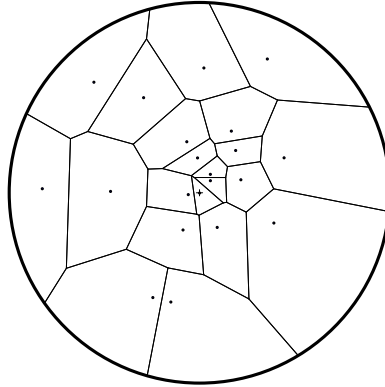


Figure 1: Hyperbolic Voronoi diagram: Klein mode.

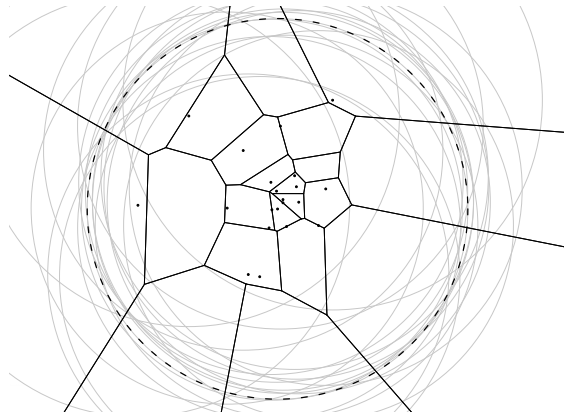


Figure 2: Hyperbolic Voronoi diagram: equivalent power diagram mode.

## Some other keys

Should clean those functionalities...

- 'h' draw regular triangulation
- 'l' toggle show tangent
- 'y' degenerate elements
- 'v' check several combinatorics
- shift hyperbolic translation
- 'g' save generator
- 'x' export Klein in `klein-output.txt`
- 't' translation in Poincaré mode
- 'j' translation
- 'r' translation
- 'f' double focus transformation

## Acknowledgments

This software use the Java Power Voronoi Diagram of Arlind Nocaj and Ulrik Brandes [3].  
<https://github.com/ArlindNocaj/power-voronoi-diagram>

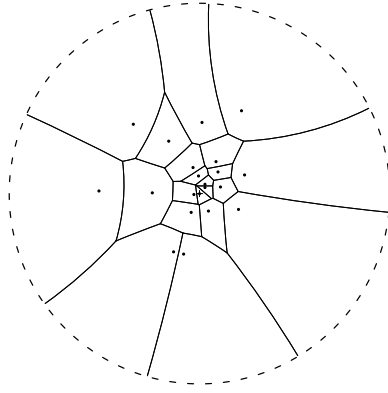


Figure 3: Hyperbolic Voronoi diagram: Poincaré mode.

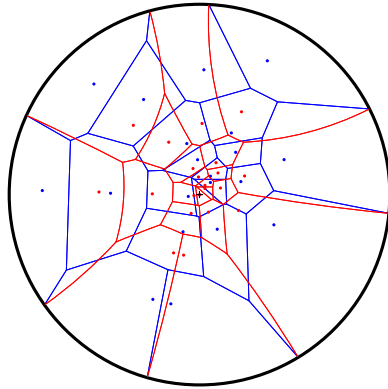


Figure 4: Overlaying Klein (non-conformal except at the origin) with Poincaré (conformal) modes.

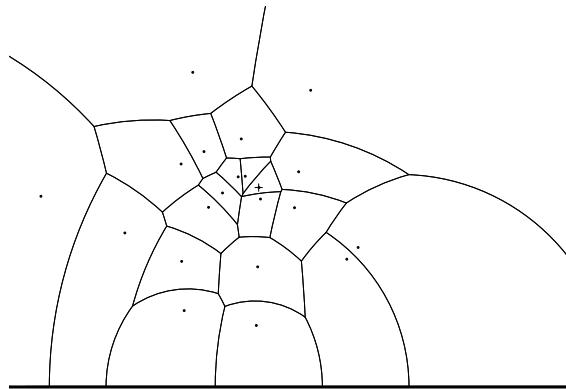


Figure 5: Hyperbolic Voronoi diagram:Upper plane mode.

## References

- [1] Frank Nielsen and Richard Nock. Hyperbolic Voronoi diagrams made easy. In *Computational Science and Its Applications (ICCSA), International Conference on*, pages 74–80. IEEE, 2010.
- [2] Frank Nielsen and Richard Nock. Visualizing hyperbolic Voronoi diagrams. In *30th Annual Symposium on Computational Geometry, SOCG, Kyoto, Japan*, page 90, 2014. <https://www.youtube.com/watch?v=i9IUzNxeH4o>.
- [3] Arlind Nocaaj and Ulrik Brandes. Computing Voronoi treemaps: Faster, simpler, and resolution-independent. In *Computer Graphics Forum*, volume 31, pages 855–864. Wiley Online Library, 2012.