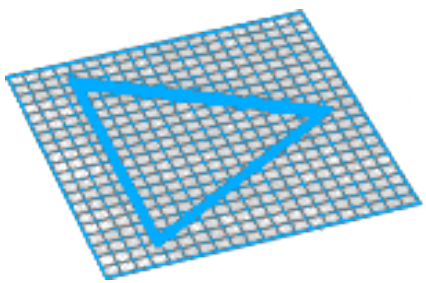
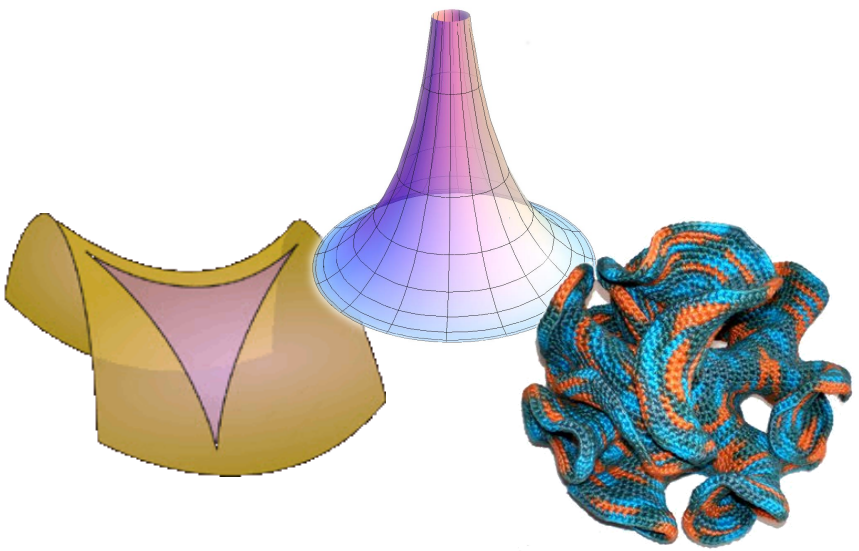
Informal definition of RHGs model

Like random geometric graphs but where the underlying space instead of being Euclidean is Hyperbolic.

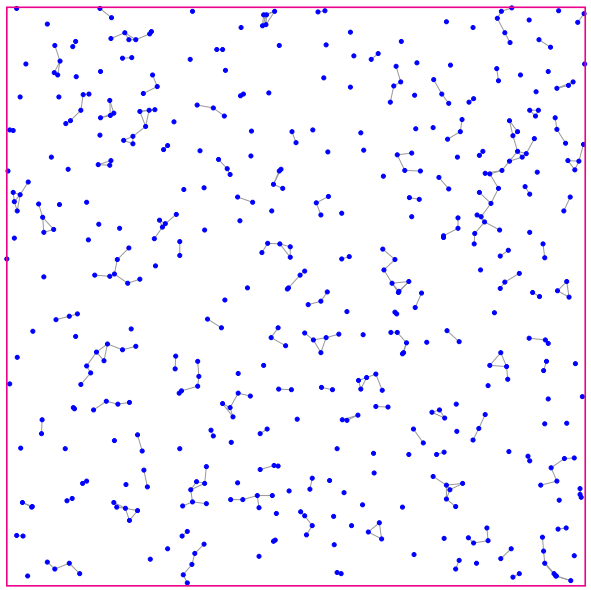
Euclidean plane $\mathbb{R}^2$



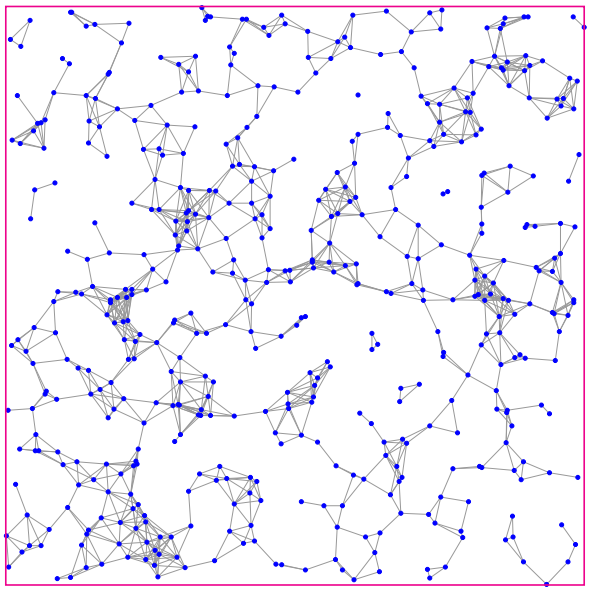
Hyperbolic plane $\mathbb{H}^2$



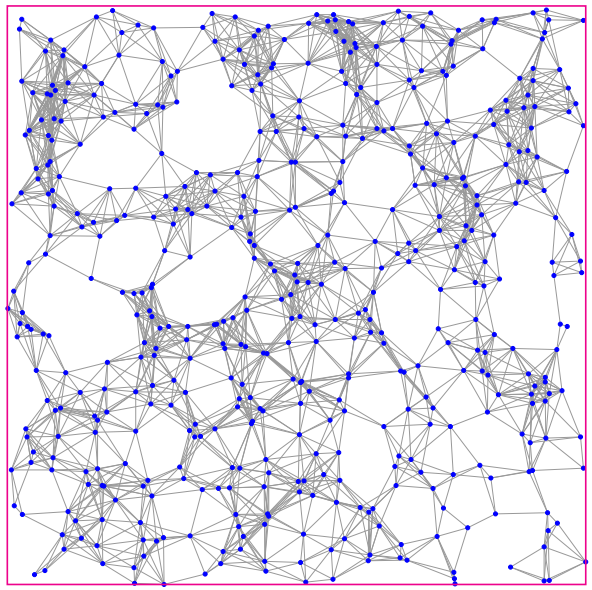
Examples of random geometric graphs



$R = 0.03$



$R = 0.06$

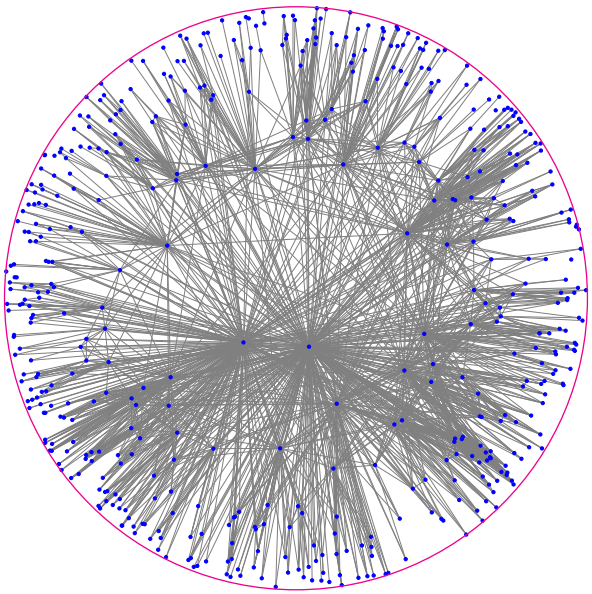


$R = 0.09$

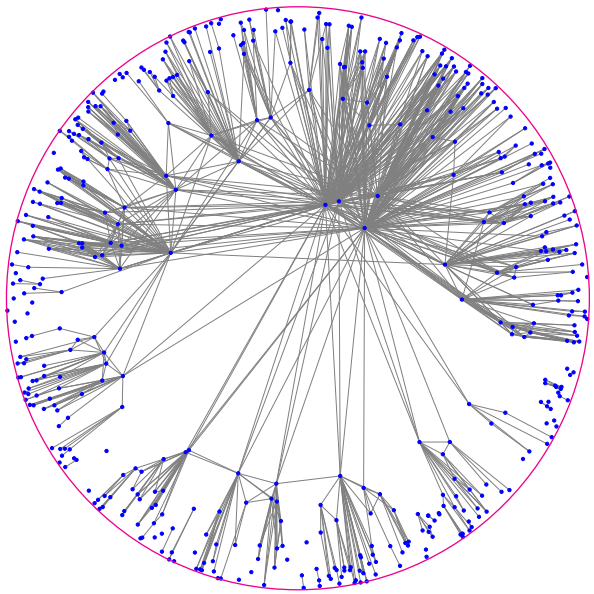
$n = 500$ points

Examples of RHGs

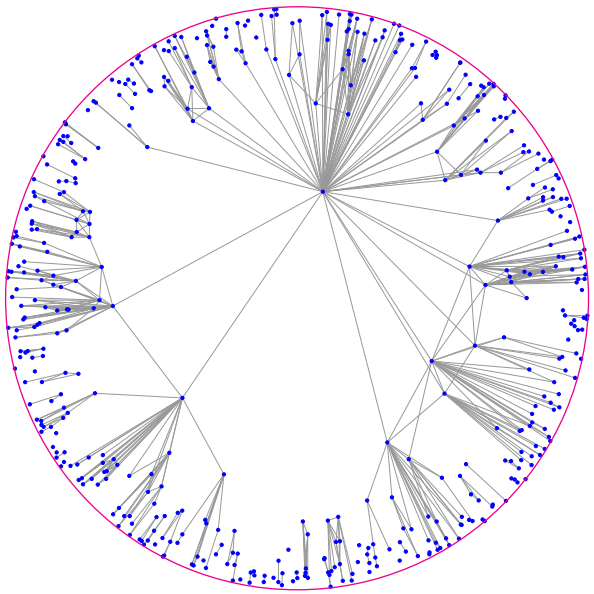
($\nu = 1$ fixed, $n = 500$)



$\alpha = 0.60$



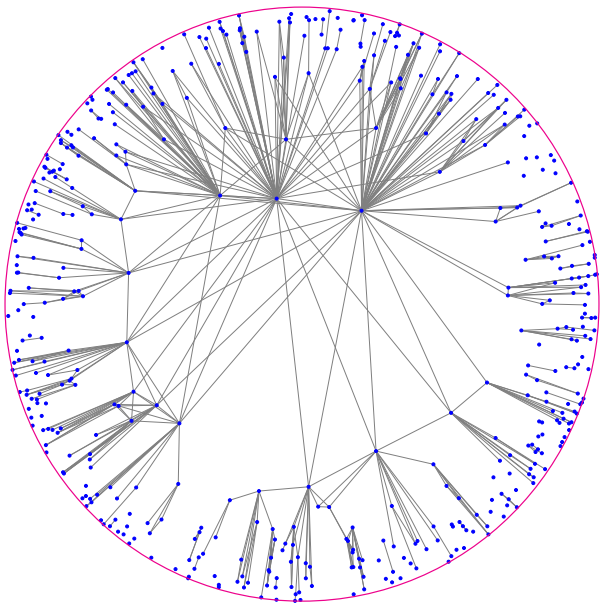
$\alpha = 0.75$



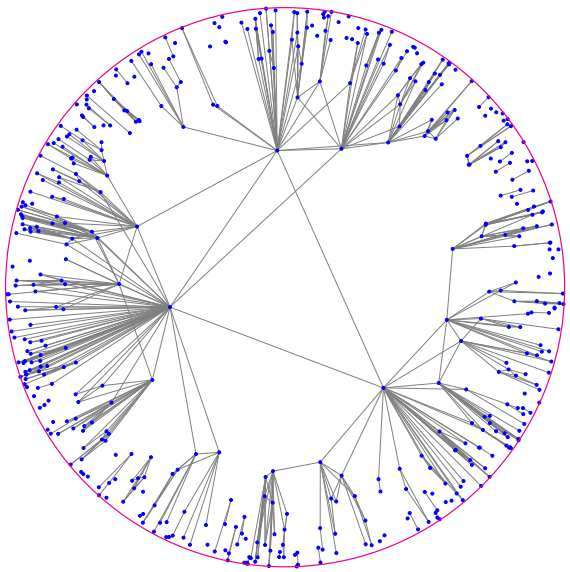
$\alpha = 0.90$

Examples of RHGs

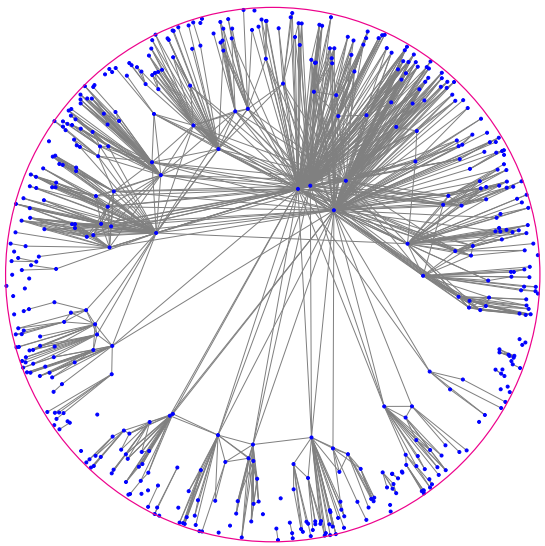
($\alpha = \frac{3}{4}$ fixed, $n = 500$)



$\nu = 0.50$



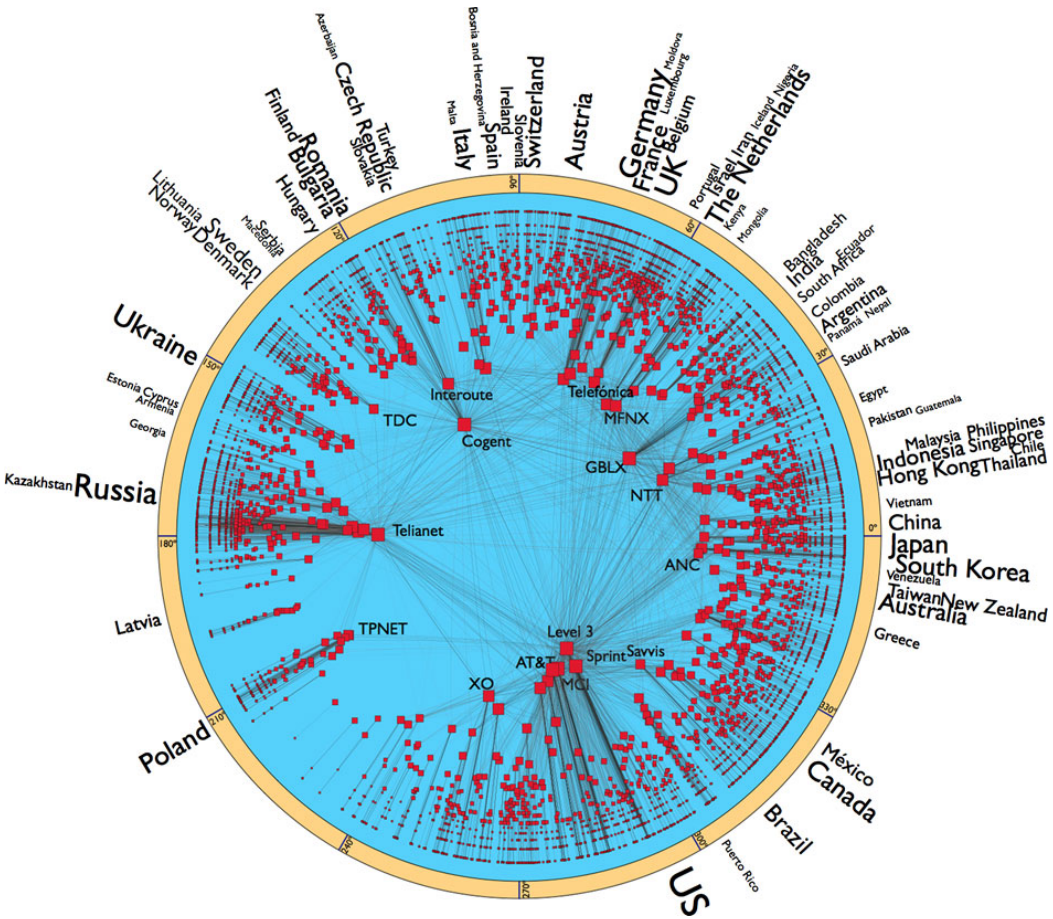
$\nu = 0.75$



$\nu = 1.00$

Mapping of Internet's Autonomous Systems (ASs)

(2009 data collected by infrastructure developed by CAIDA)



[From Boguñá, Papadopoulus, Krioukov (Nat. Comm. '10)]

Data set:

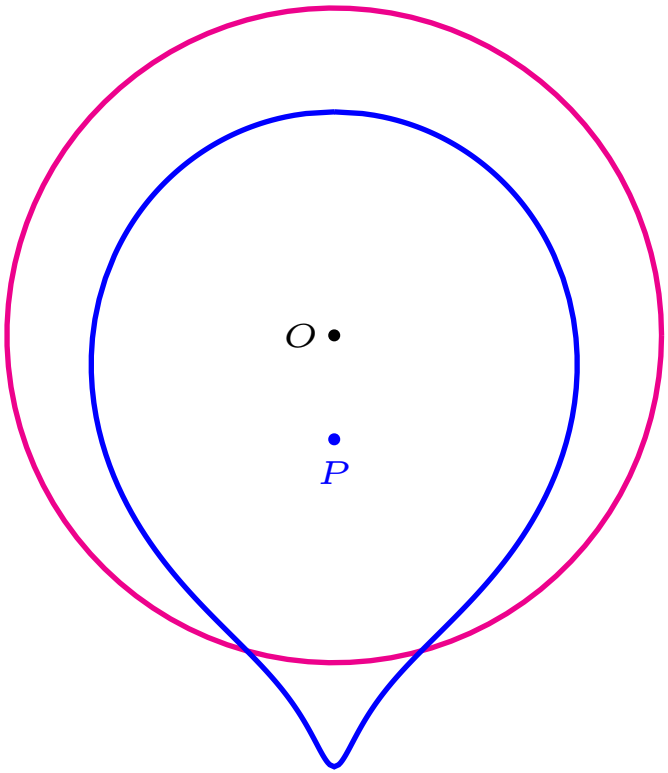
- $23,752$ ASs
- $58,416$ links
- Average degree 4.92

"Maximum Likelihood" fit:

- $\alpha = 0.55$
- $R = 27$
- Temperature $T = 0.69$

Vertex degrees

(measure of non-centered balls)



Calculations yield

$$\mu(B_P(R)) = C_\alpha e^{-\frac{r_P}{2}}(1 + o(1)).$$