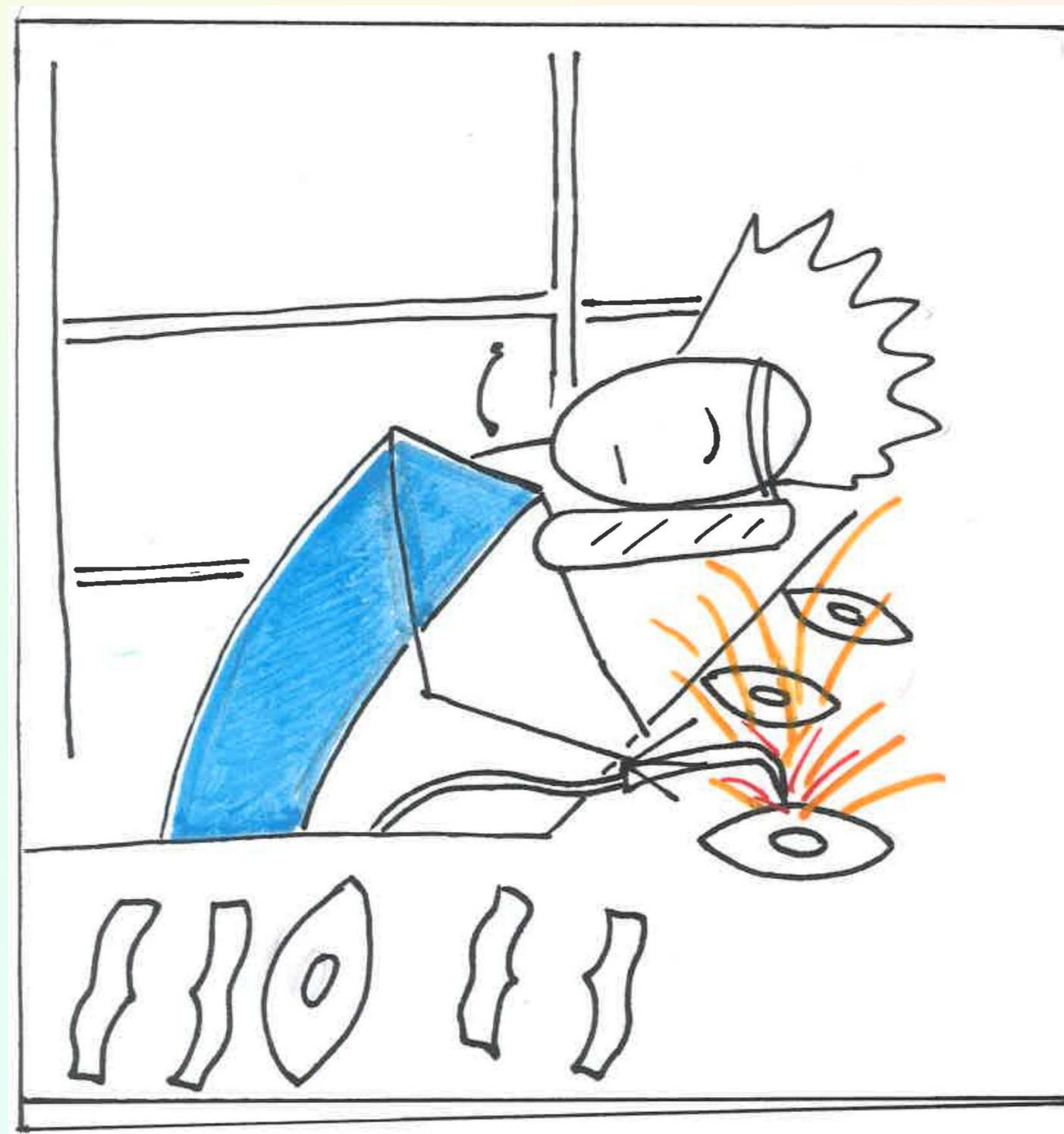


LE RULPIDON

UNE SCULPTURE FASCINANTE

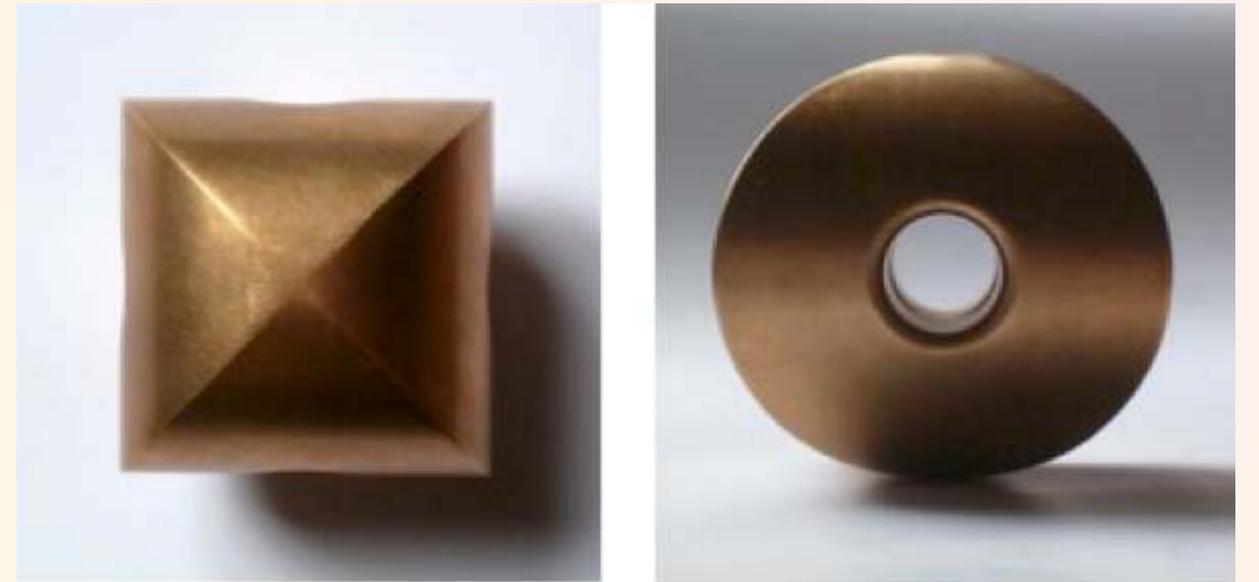
« LE » RULPIDON

QU'EST-CE DONC ?



« LE » RULPIDON

QU'EST-CE DONC ?



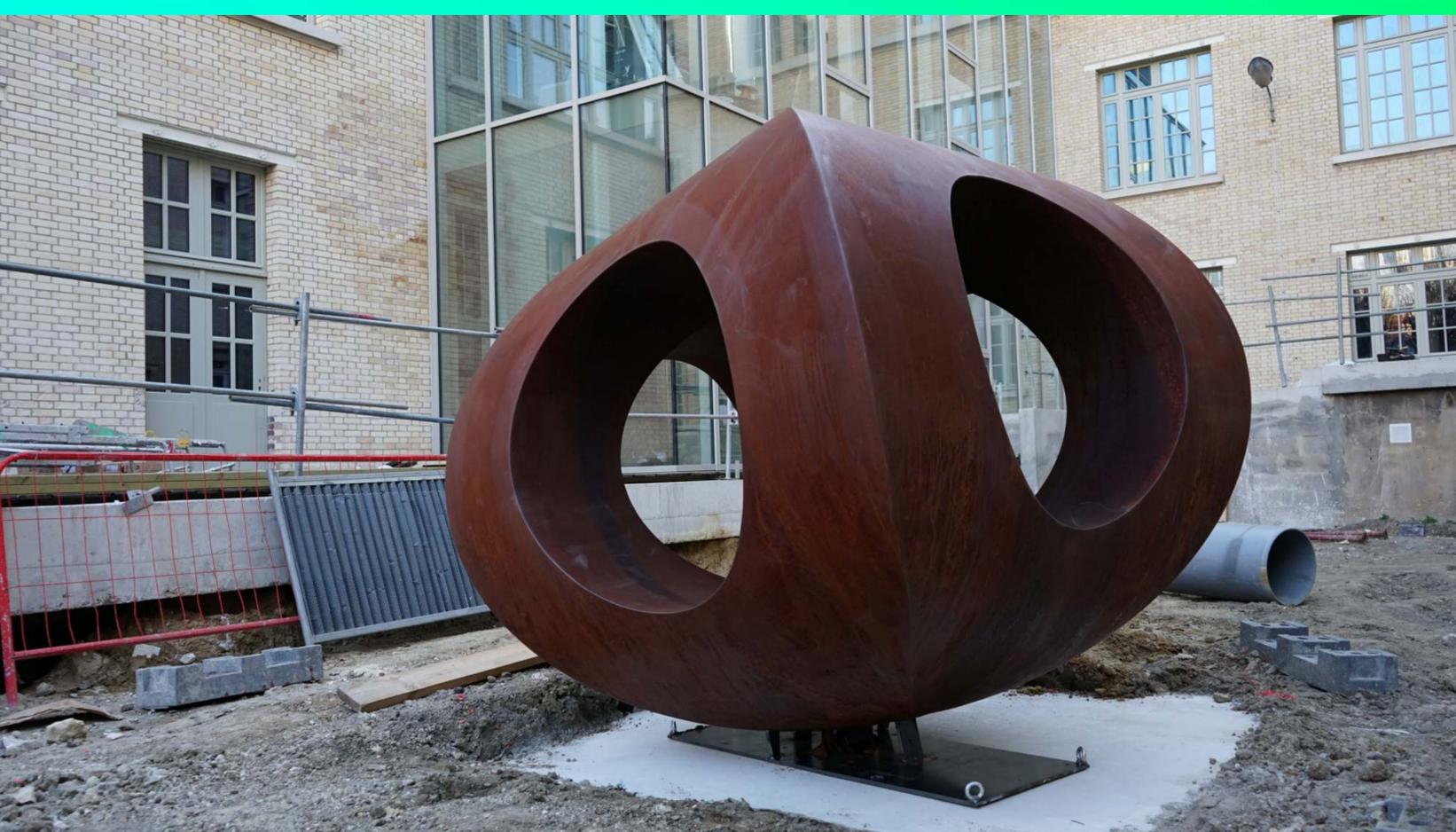
© Ulysse Lacoste, Rulpidon, modèle en bronze, 2017

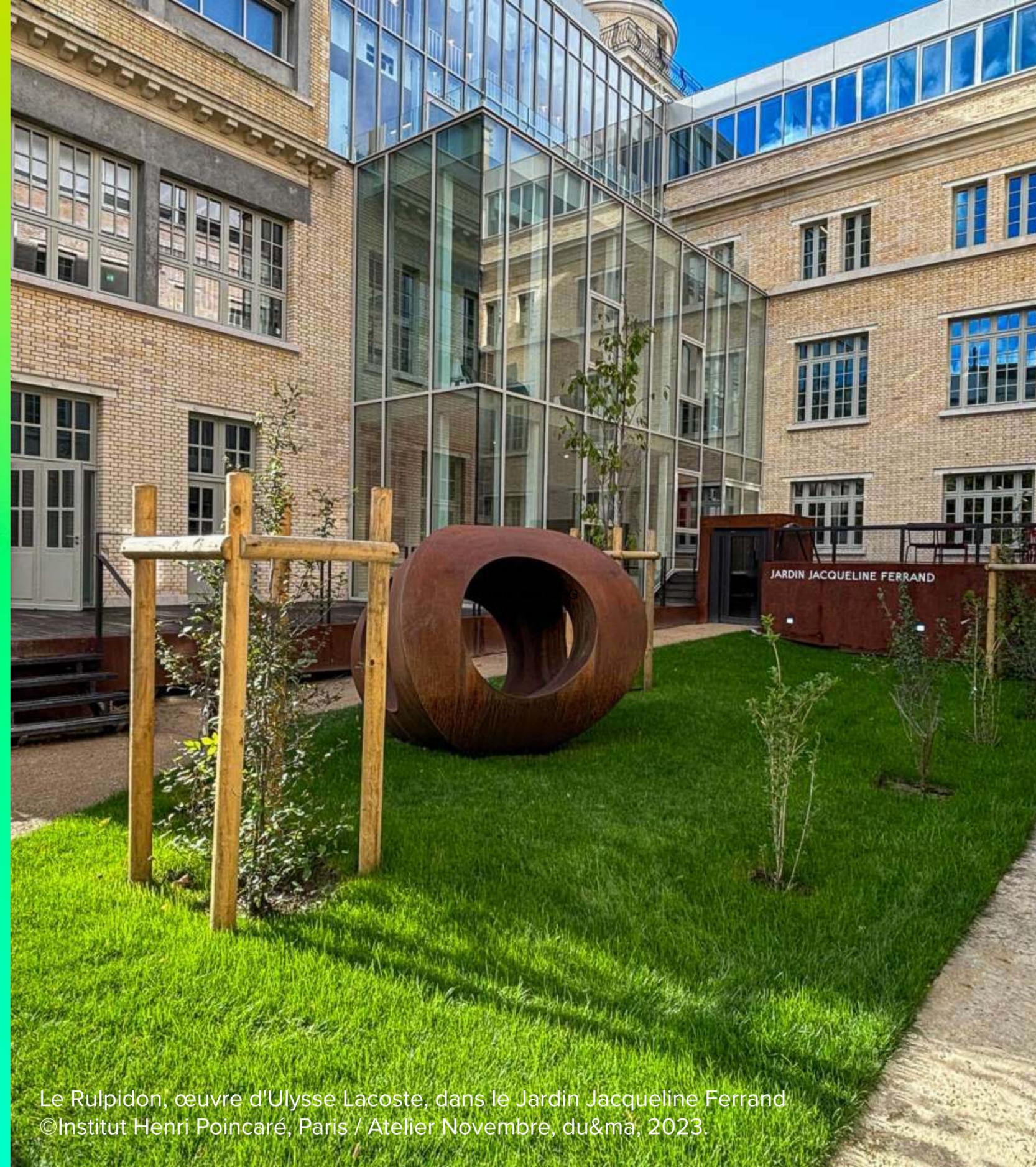
Pierrick Sorin, théâtre optique, Maison Poincaré - Hall

©Institut Henri Poincaré, Paris / Atelier Novembre, du&ma 2023

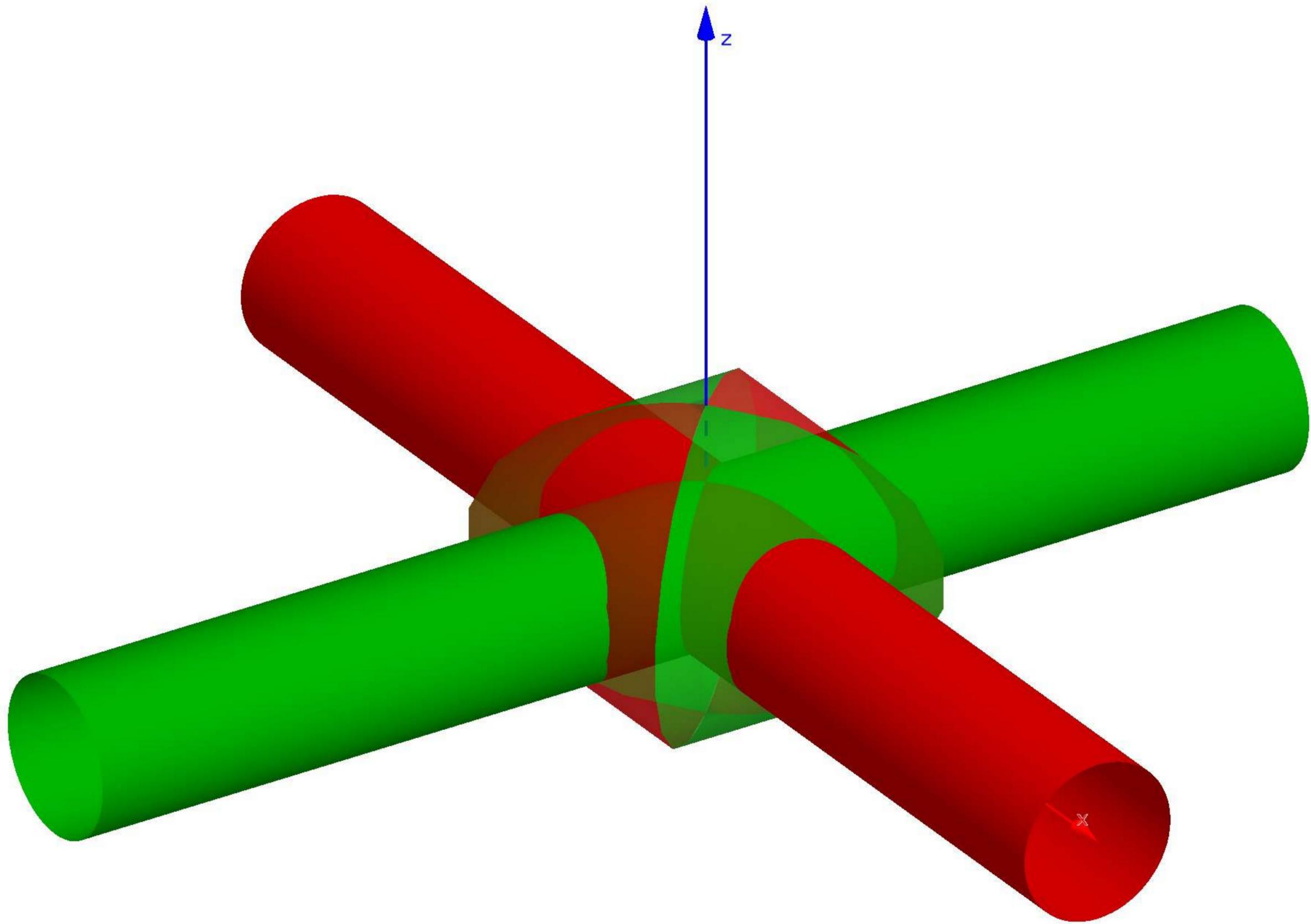
Ulysse Lacoste 2017



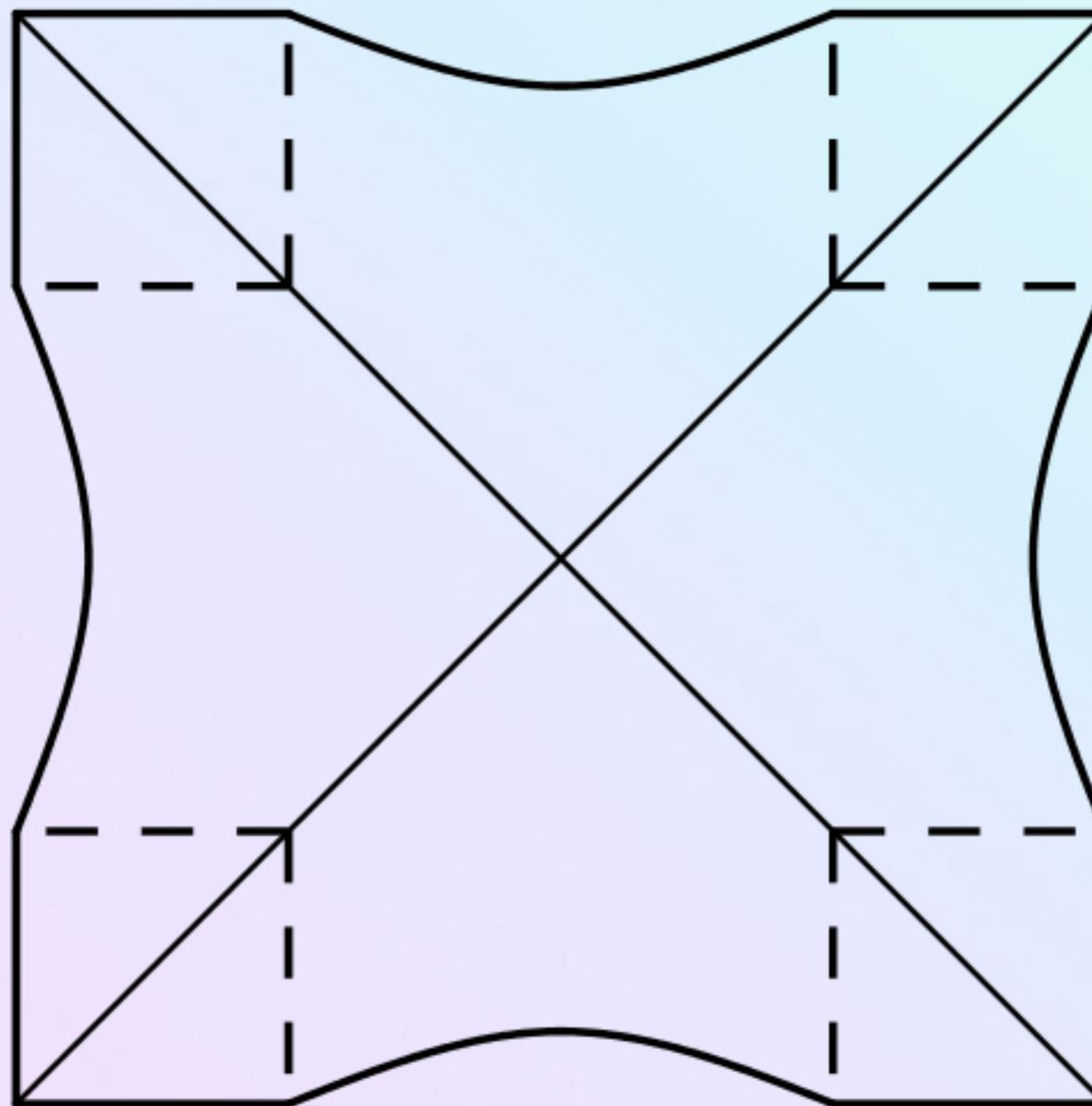




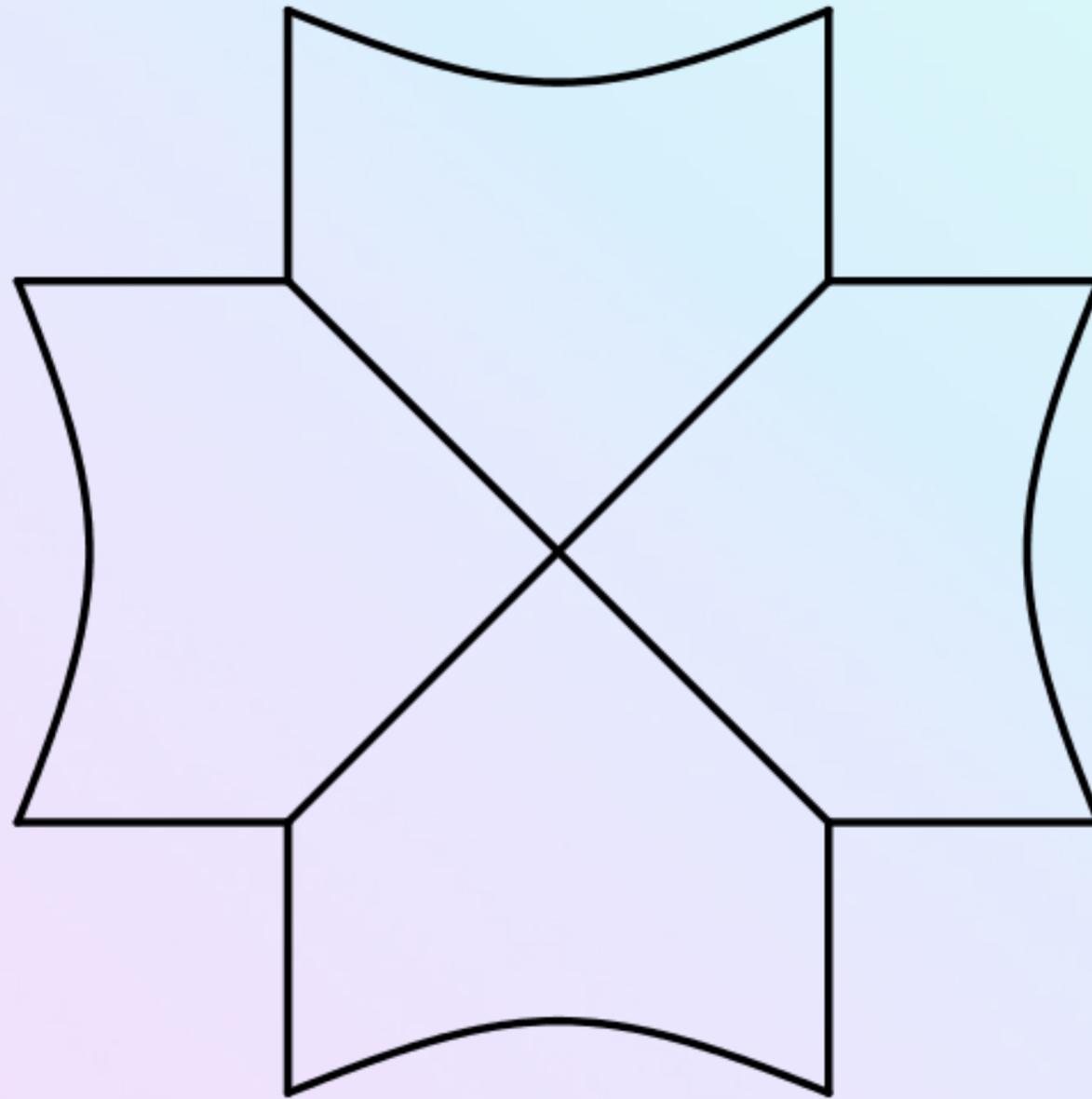
Le Rulpidon, œuvre d'Ulysse Lacoste, dans le Jardin Jacqueline Ferrand
©Institut Henri Poincaré, Paris / Atelier Novembre, du&ma, 2023.



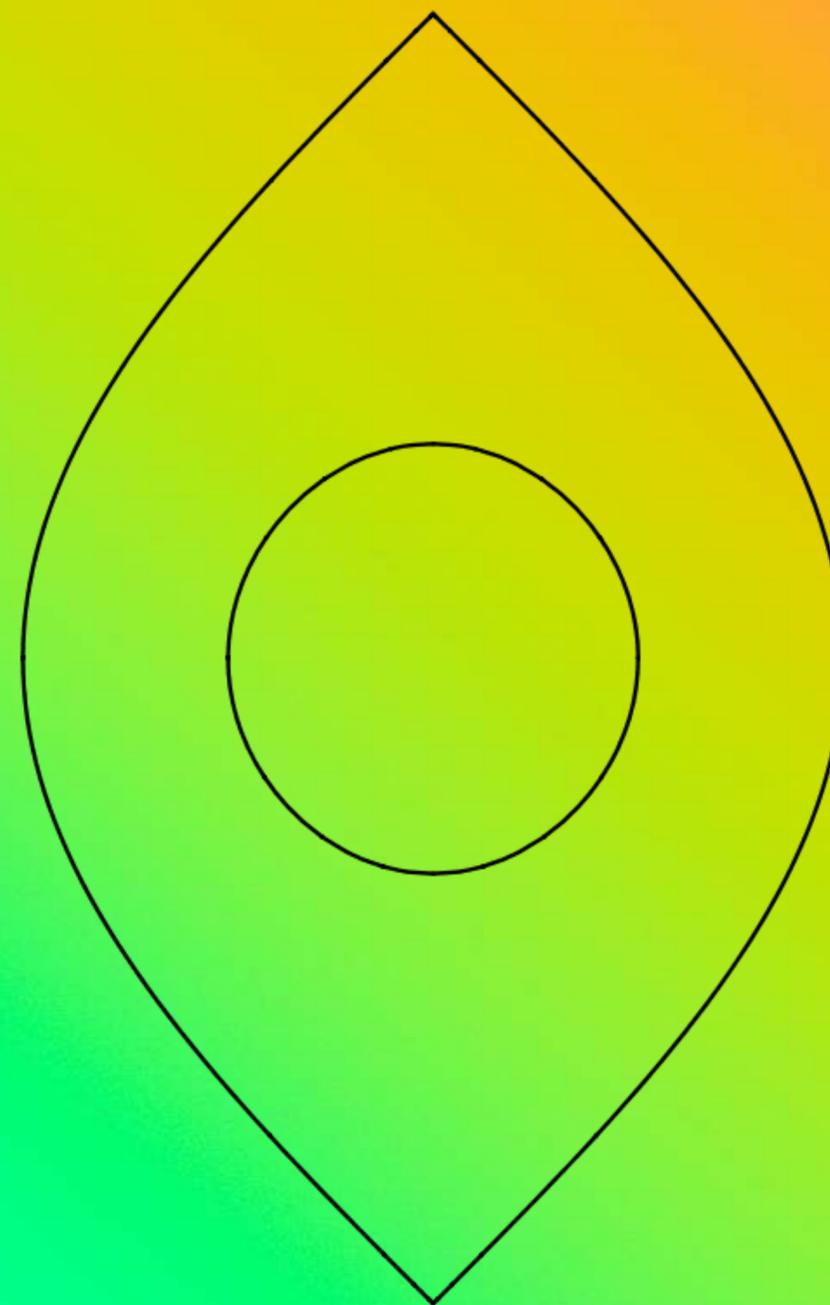
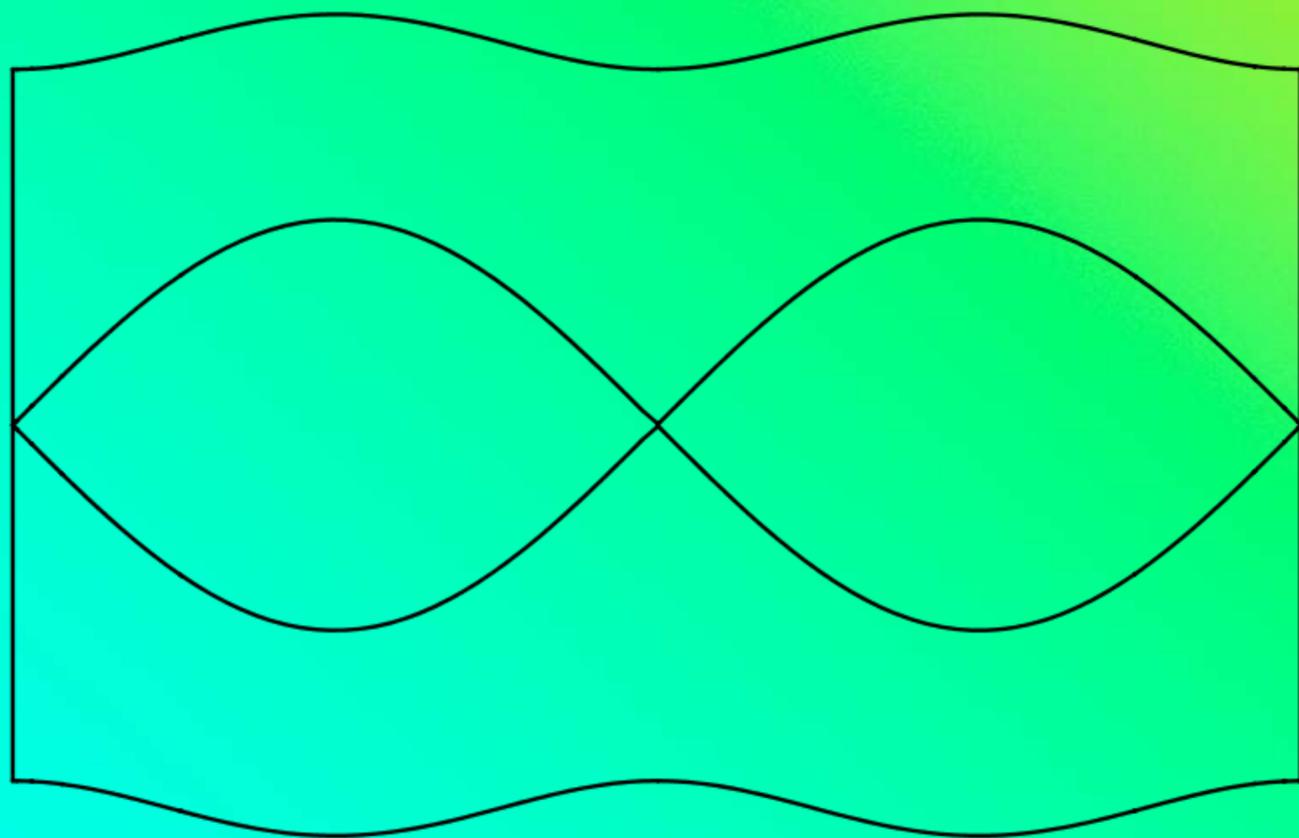
VU DU « DESSUS »

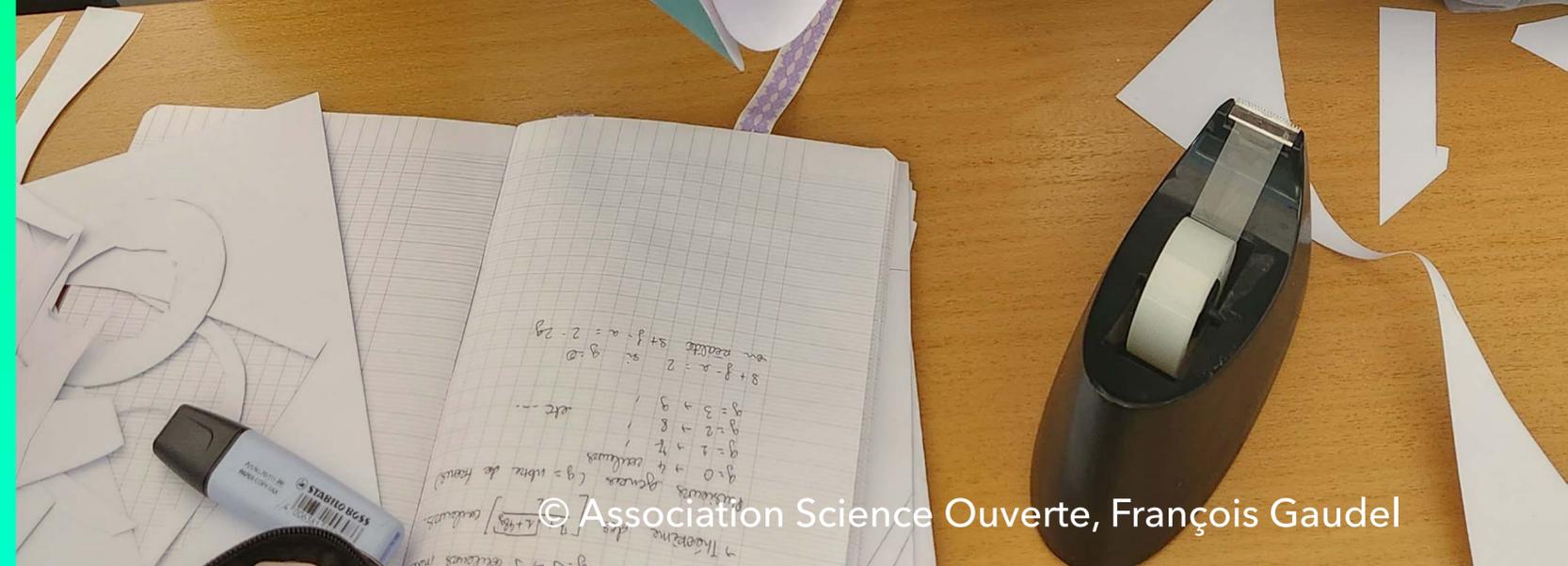
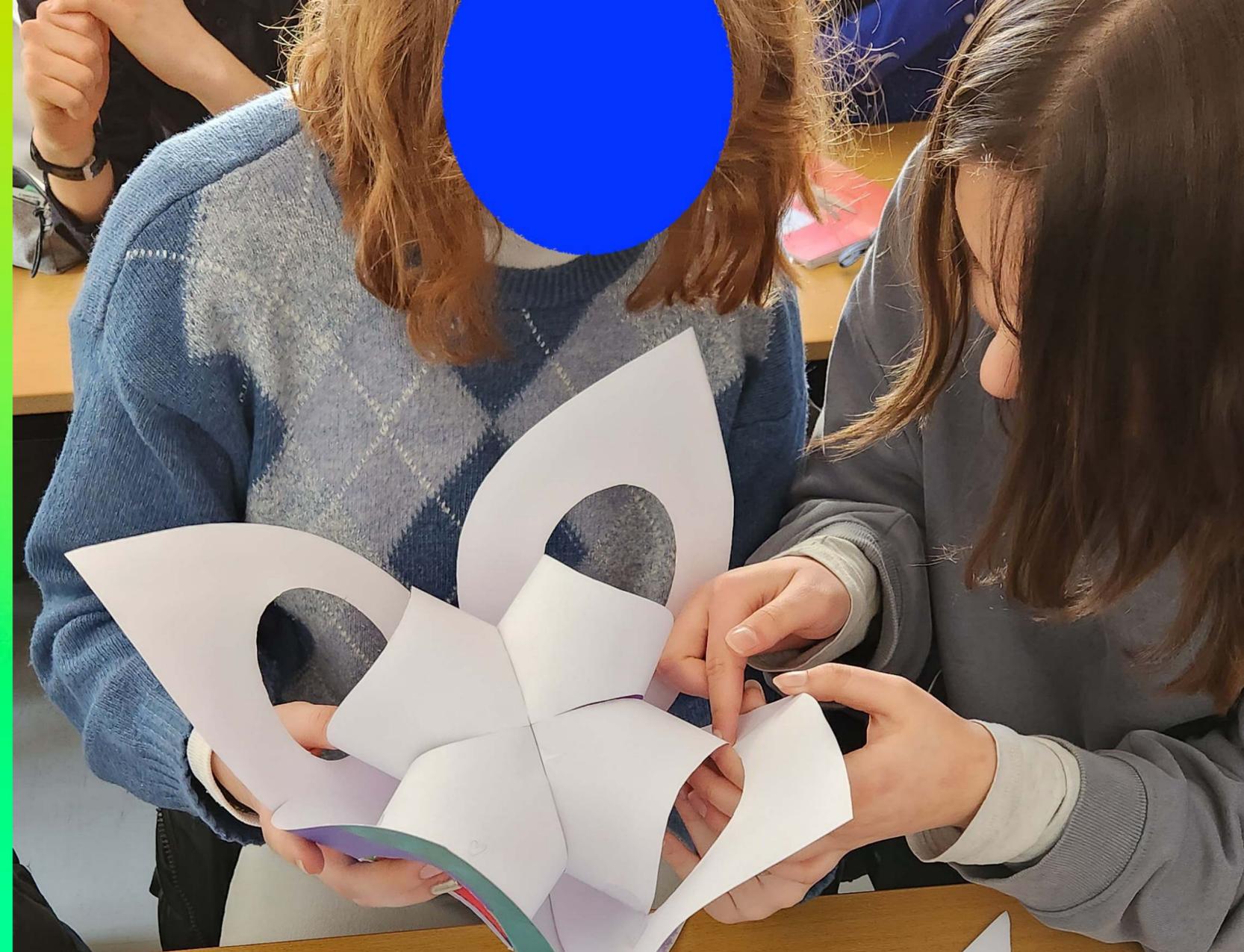


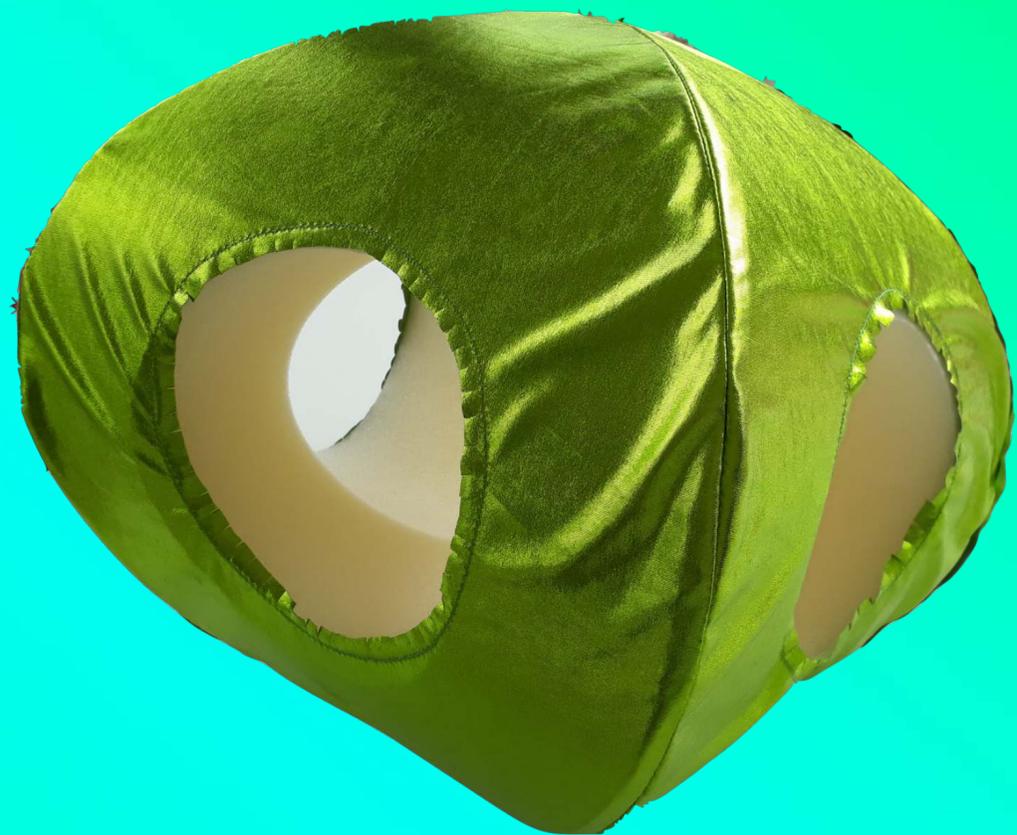
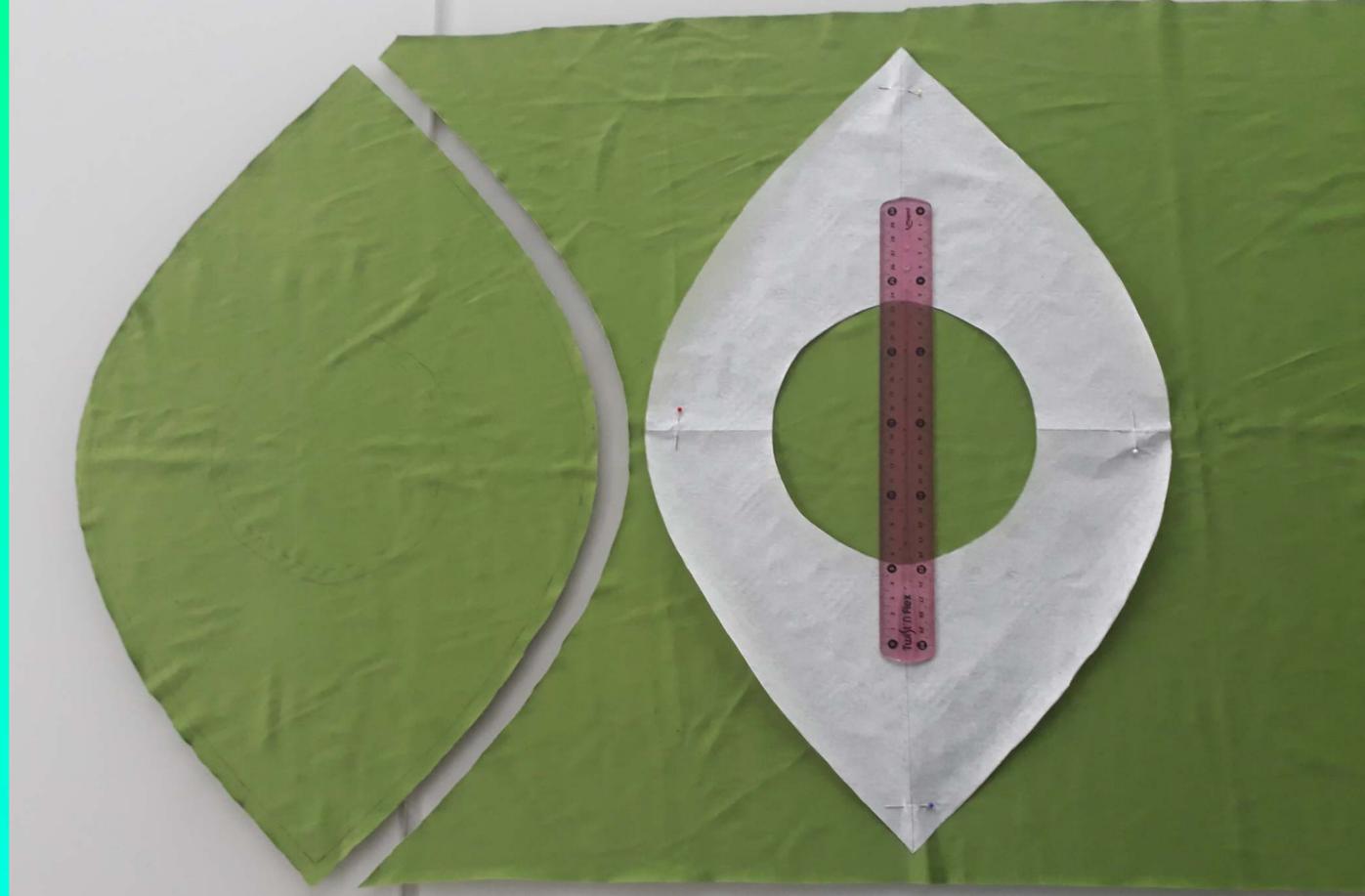
« INTÉRIEUR »



PATRON







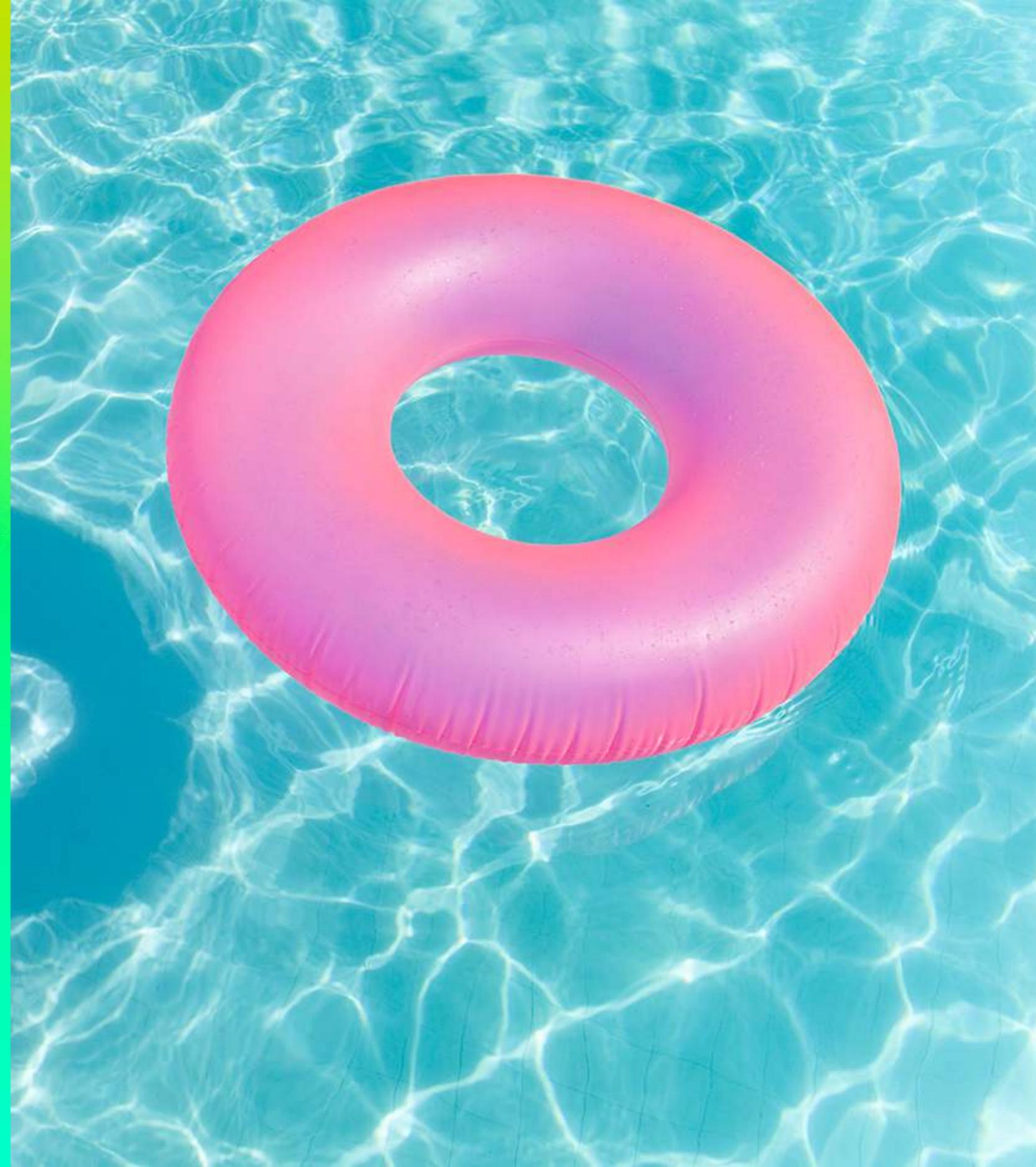
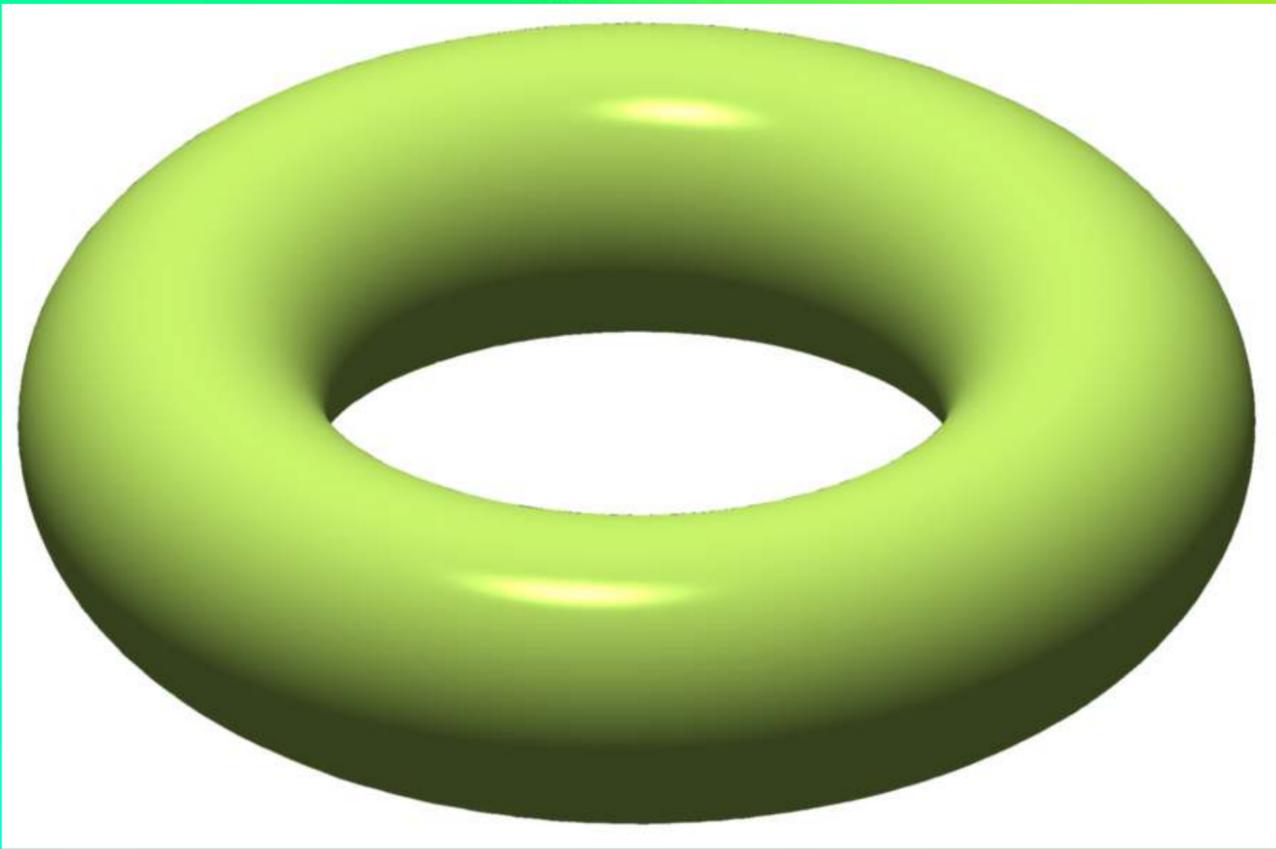


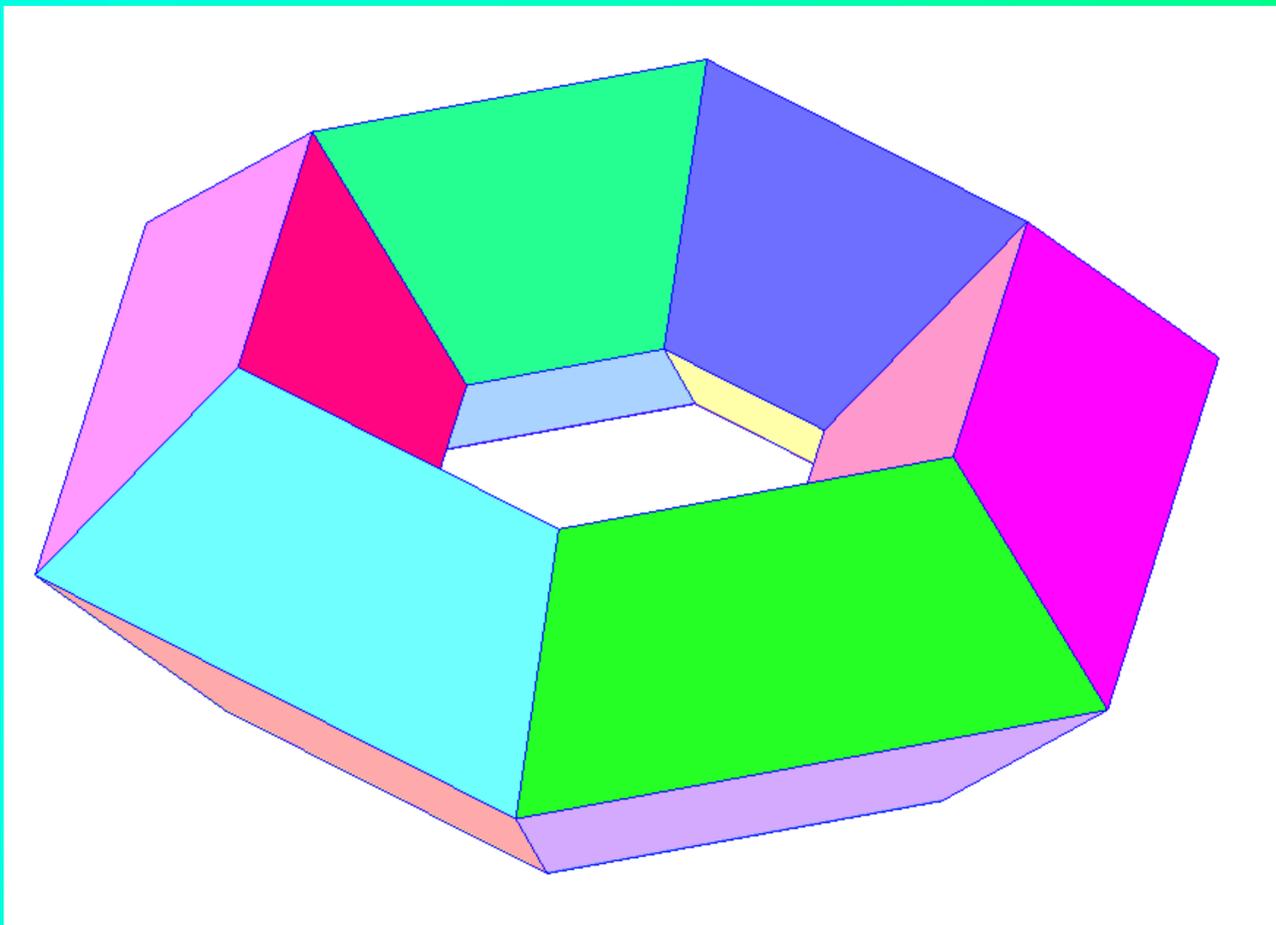
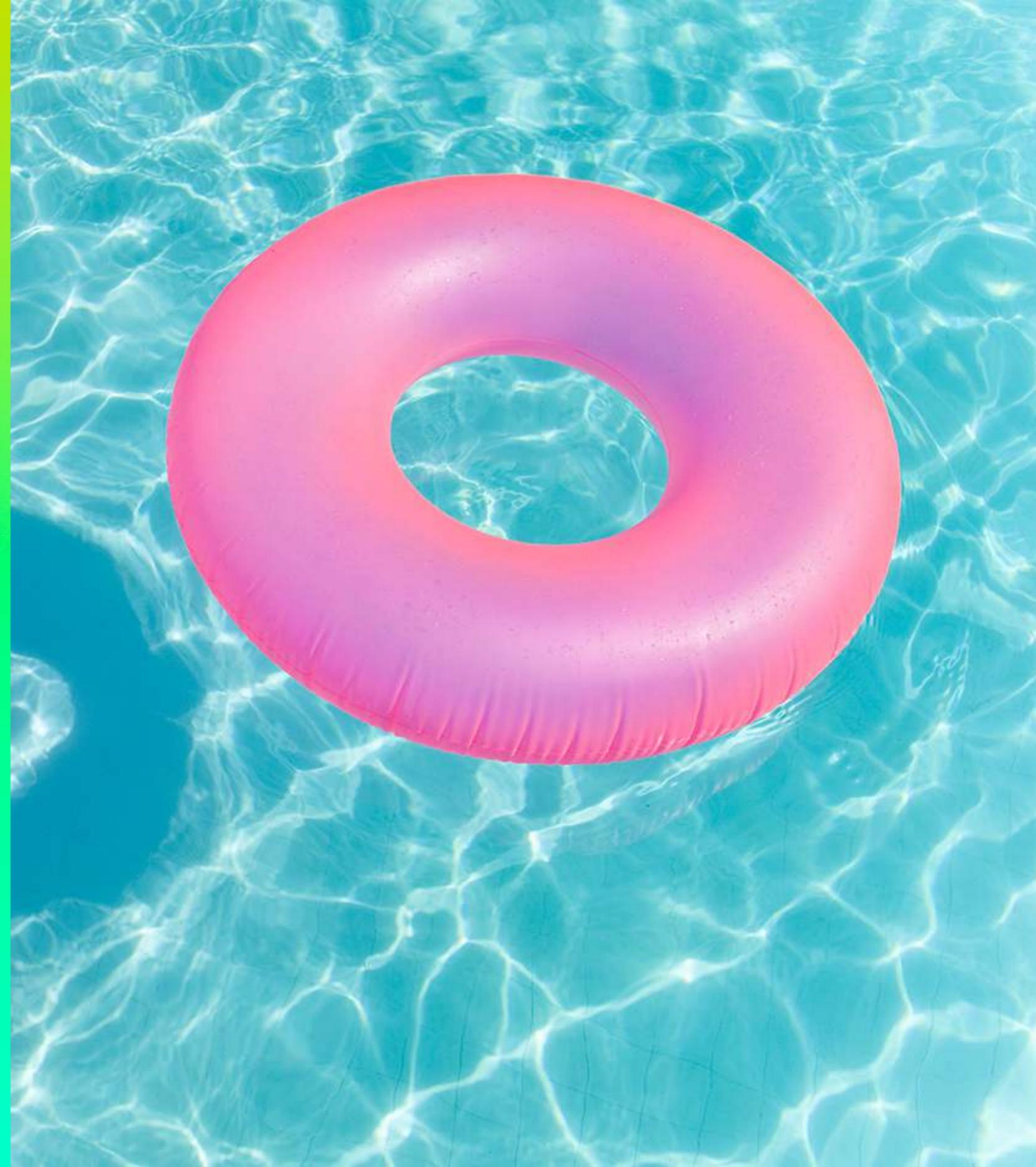
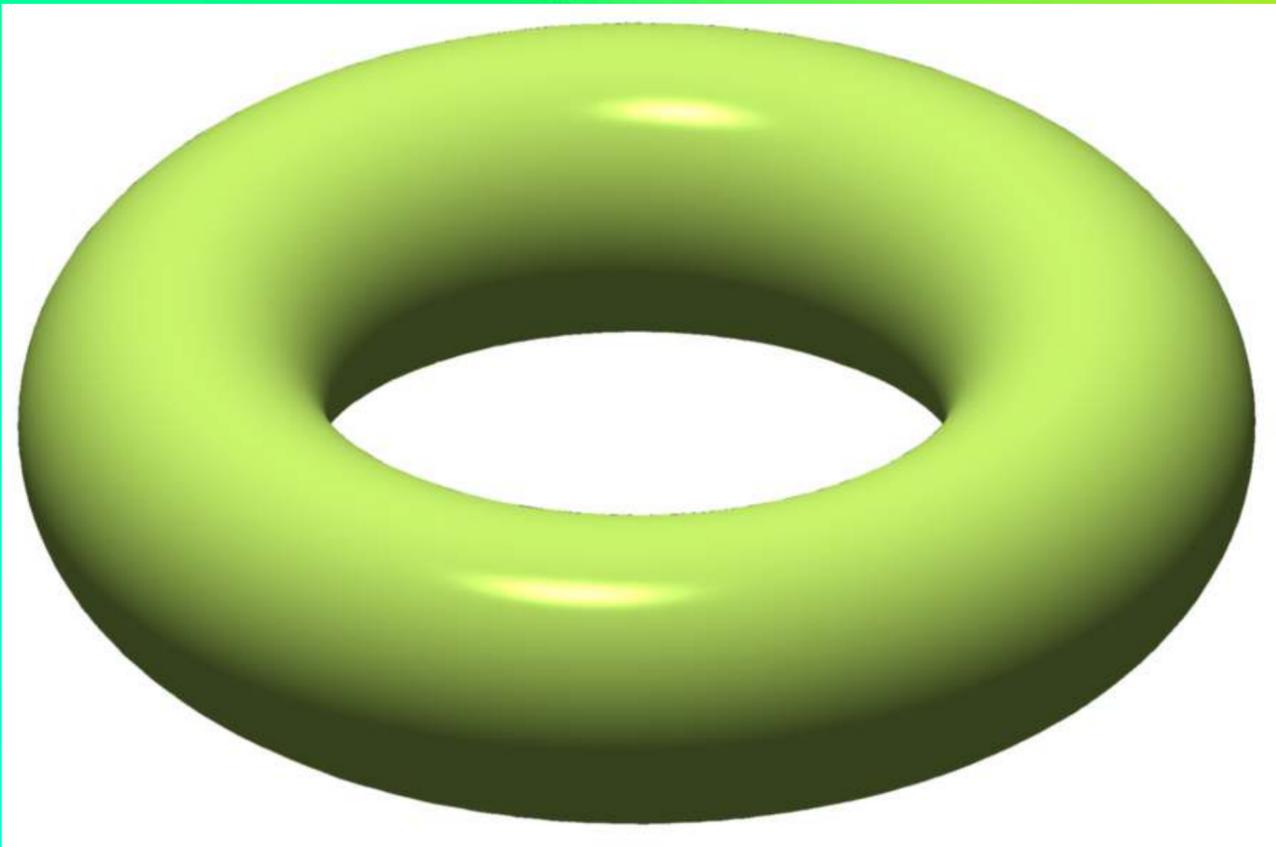


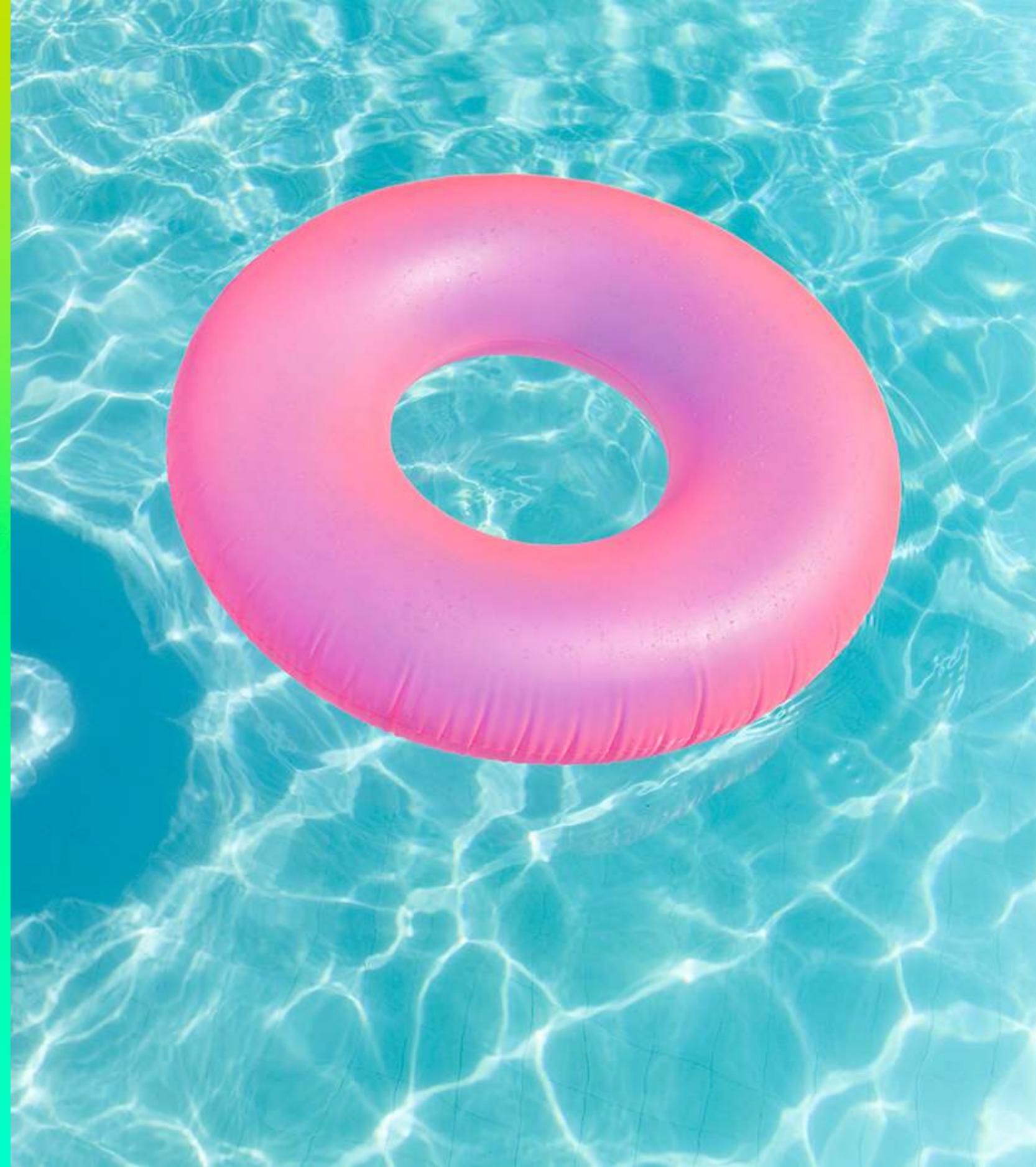
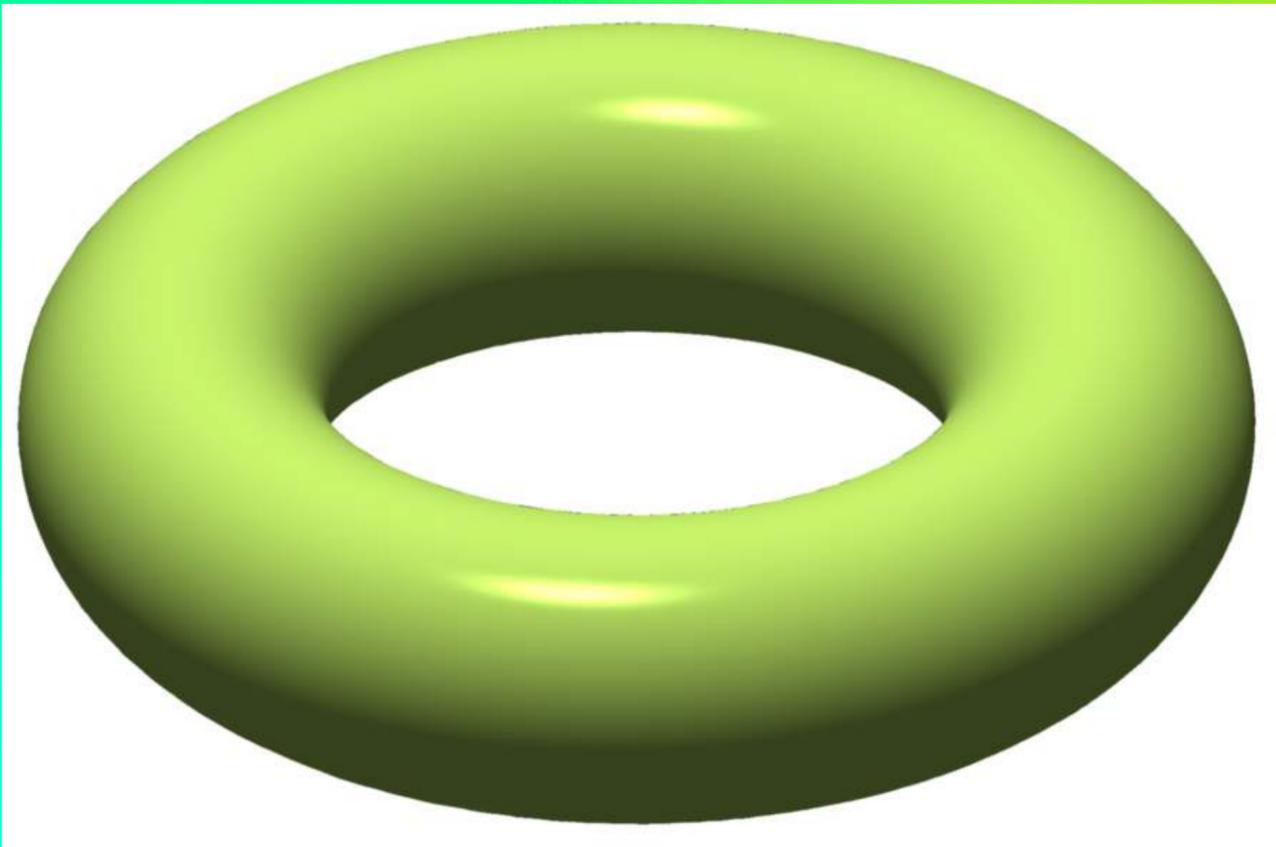
LES « TROUS » DU RULPIDON

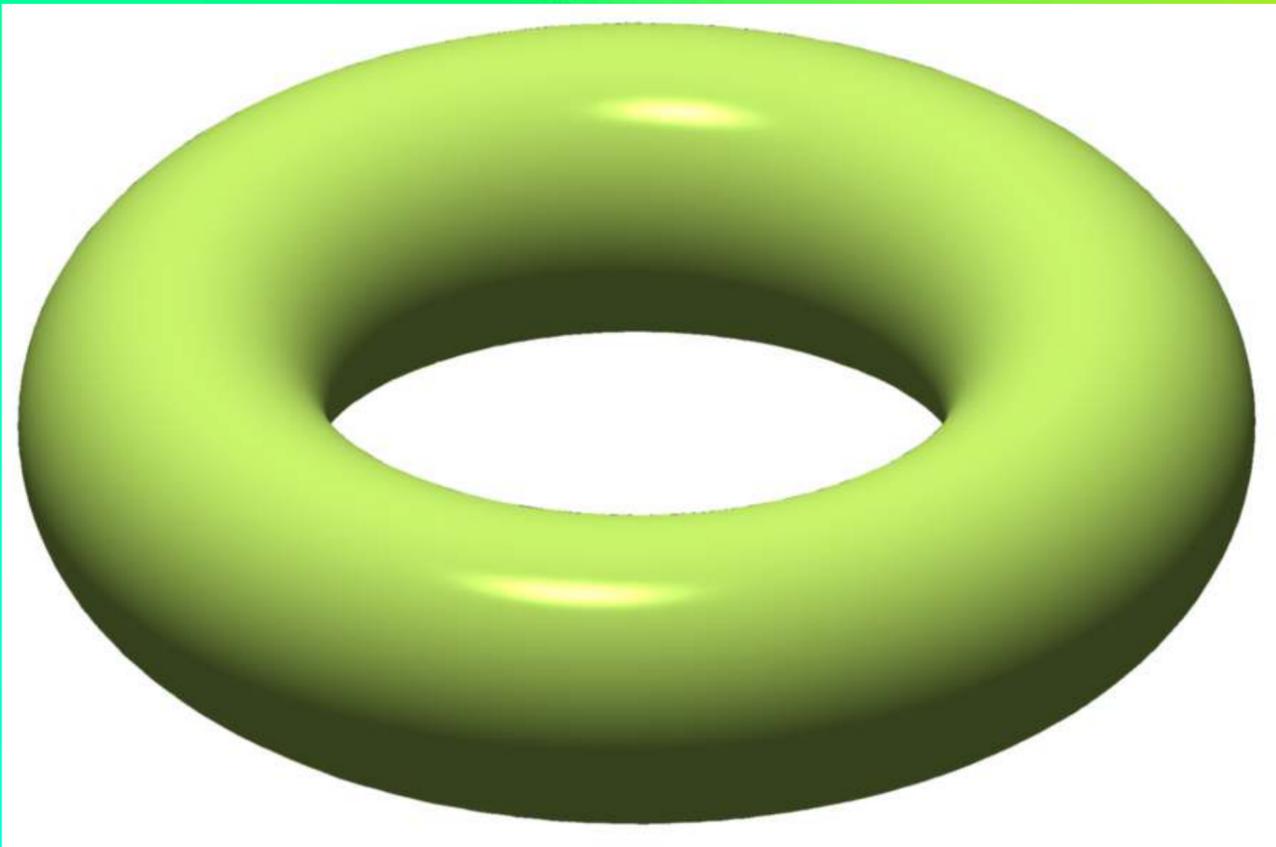




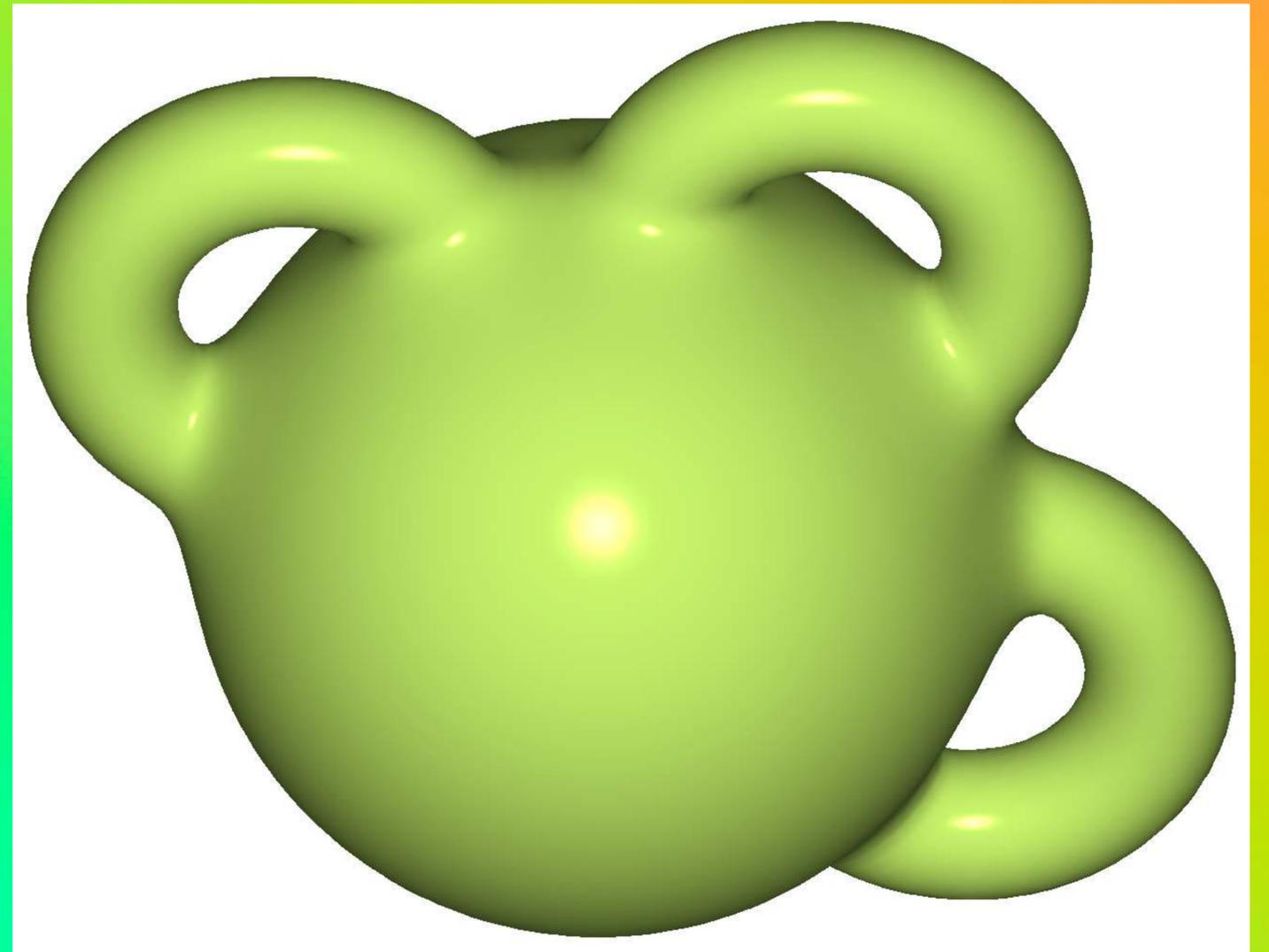
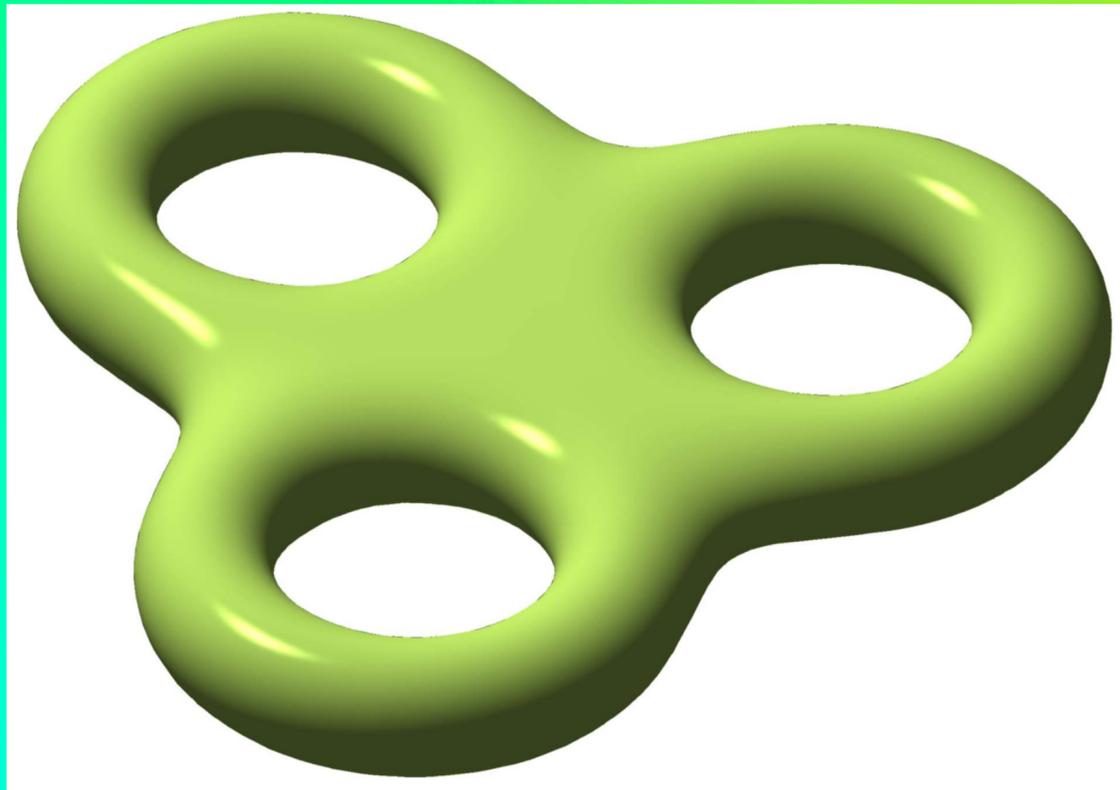


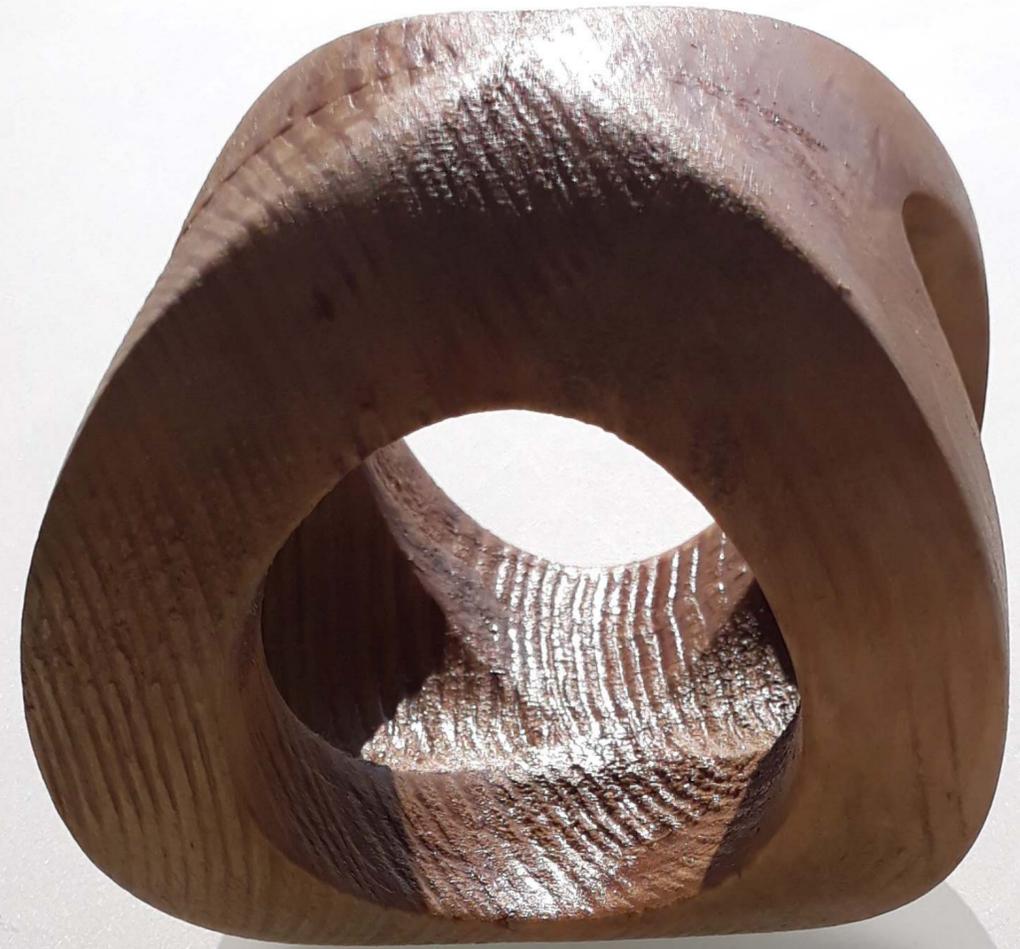
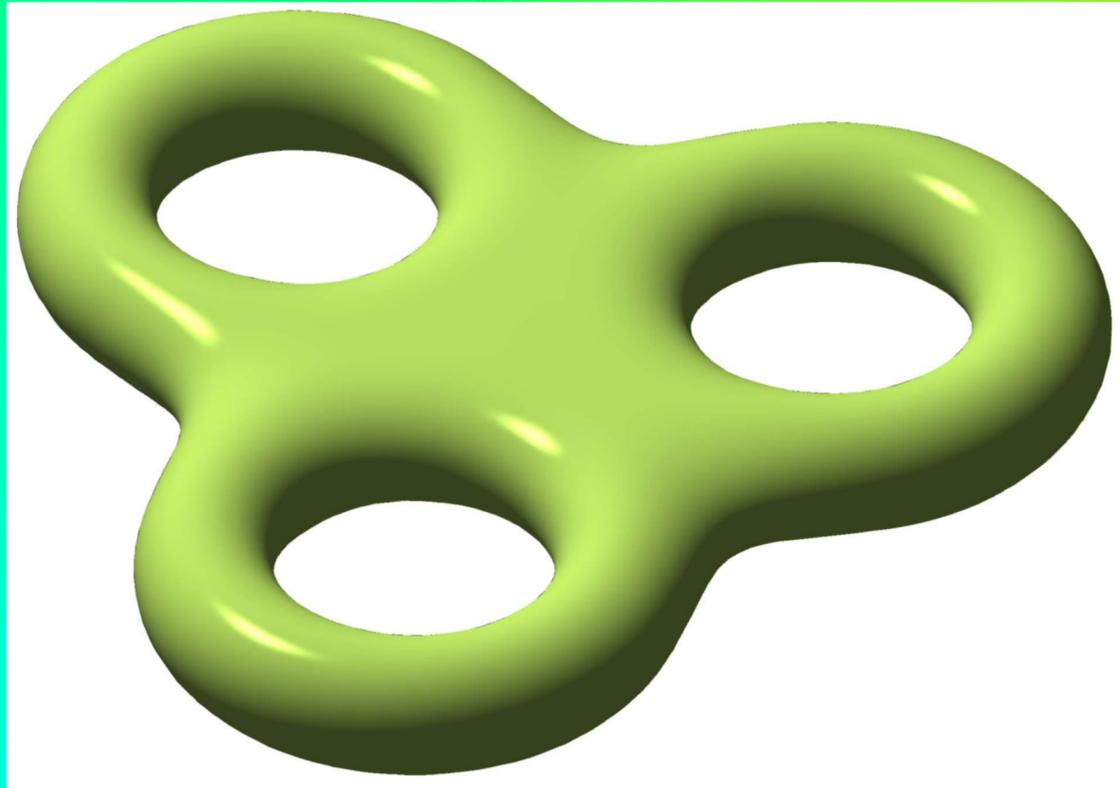














© Clifford Johnson

**EN TOPOLOGIE, LE NOMBRE DE
TROUS S'APPELLE LE GENRE**

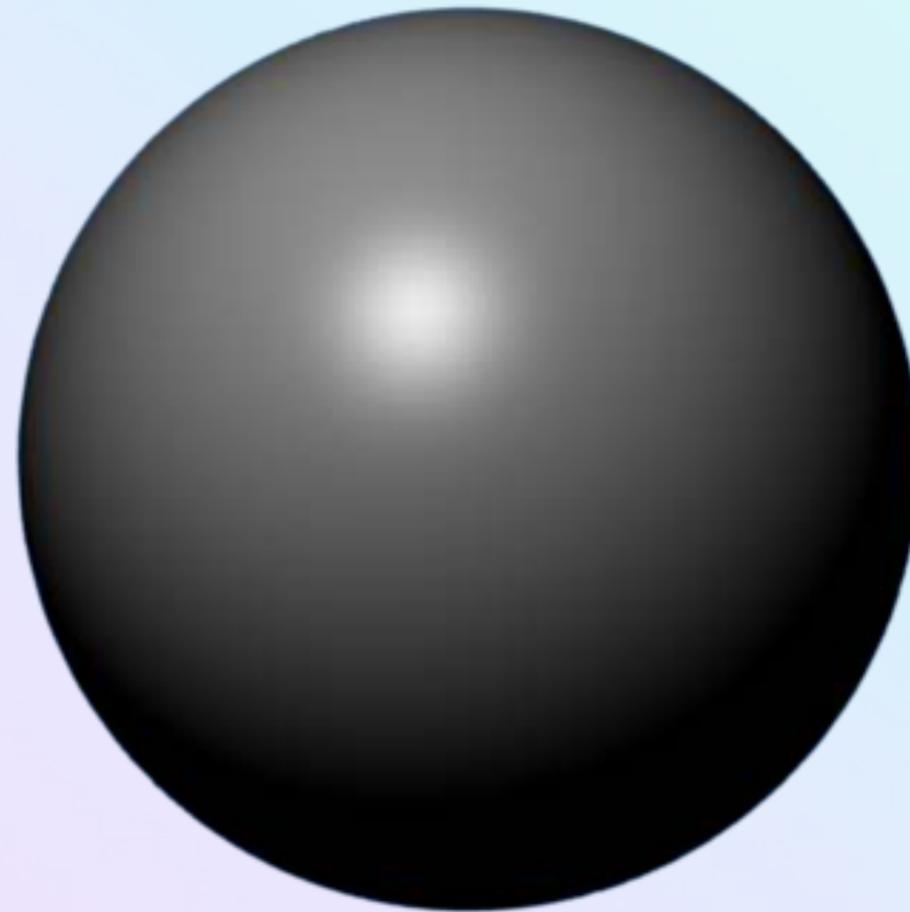
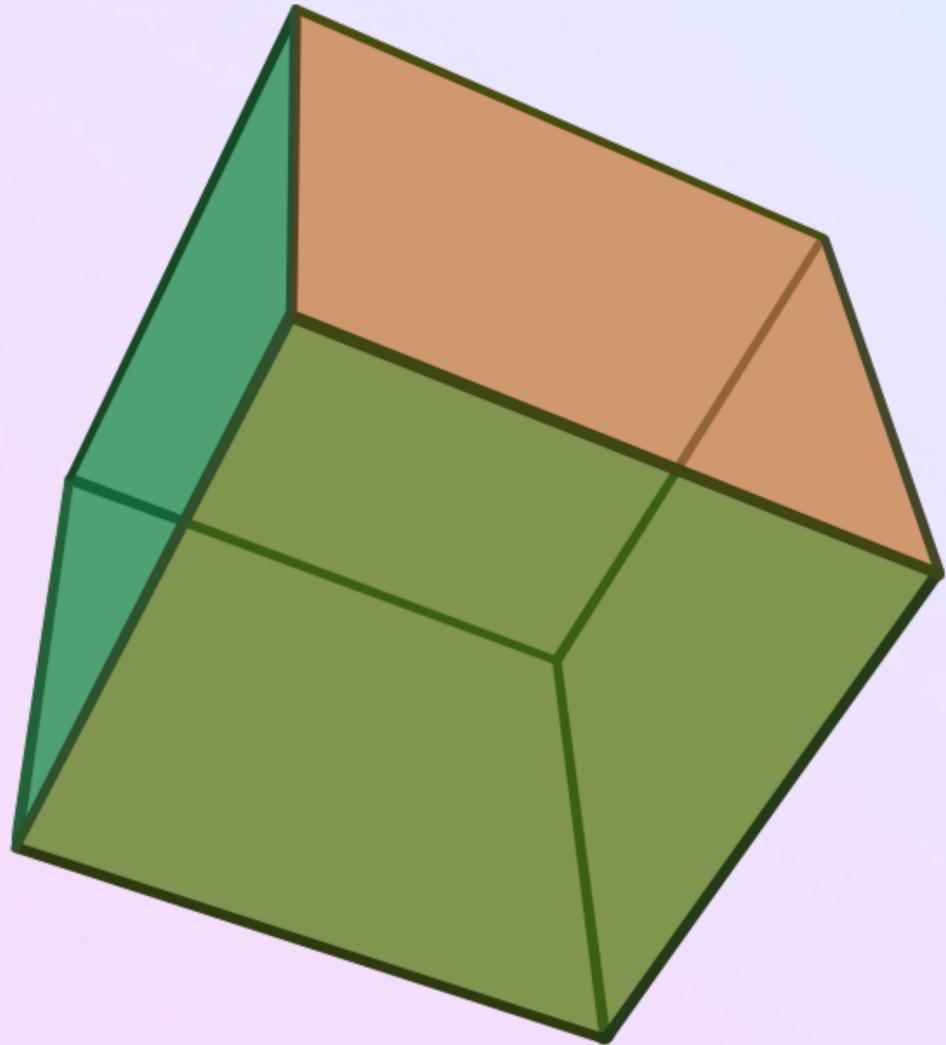
LA TOPO-QUOI ?



**EN TOPOLOGIE, ON ÉTUDIE LES
OBJETS « À DÉFORMATION PRÈS »**

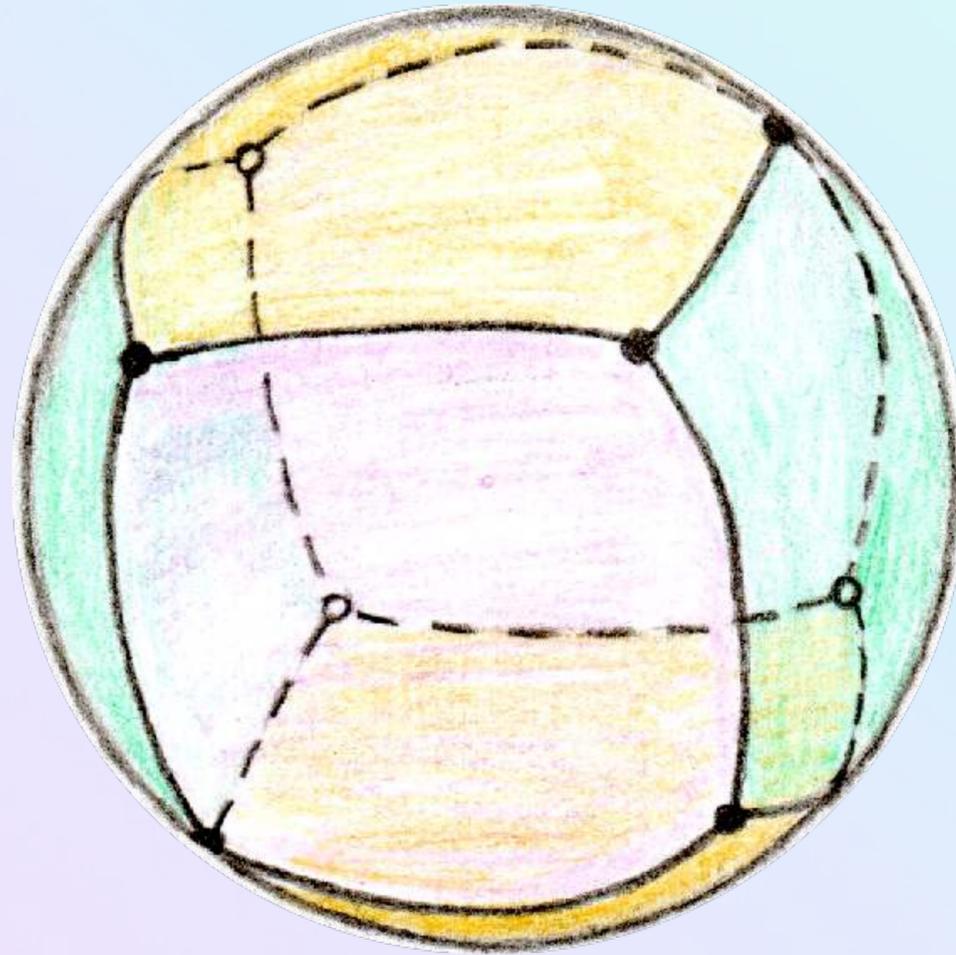
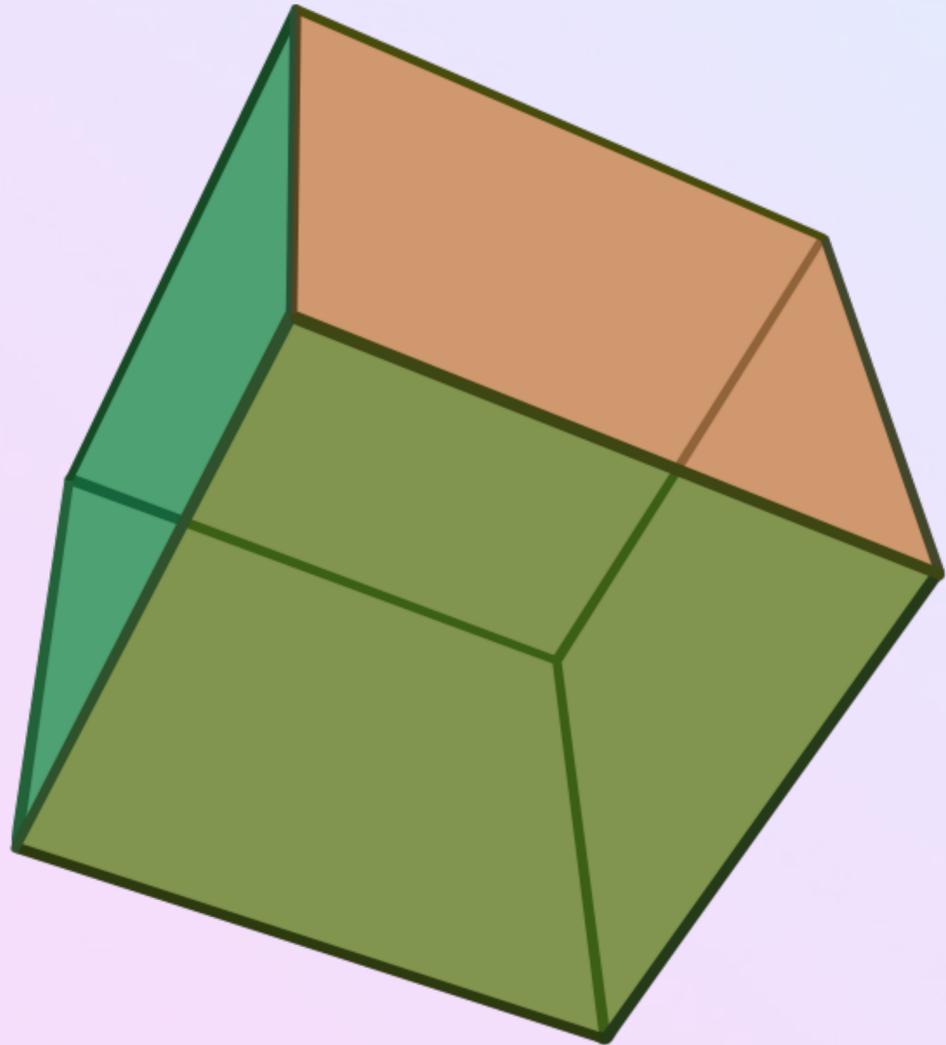
EXEMPLES

LA TOPOLOGIE NE FAIT PAS LA DIFFÉRENCE ENTRE UN CUBE ... ET UNE BOULE !



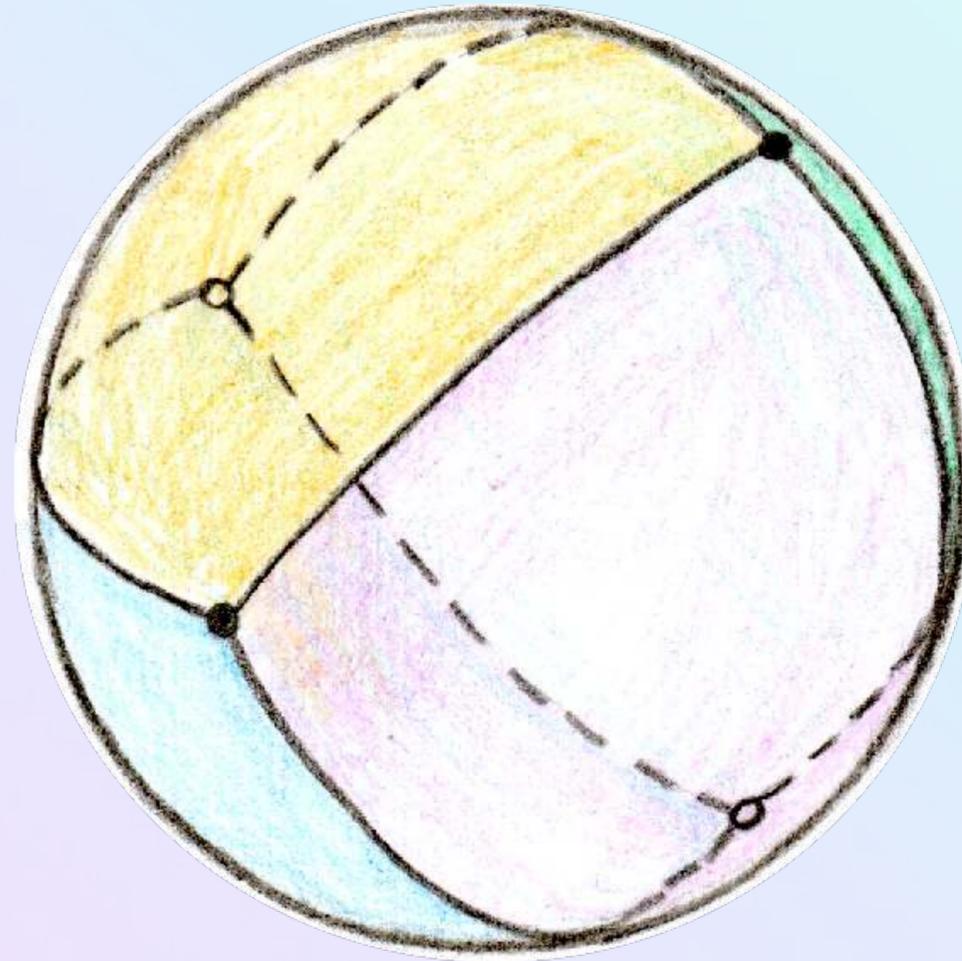
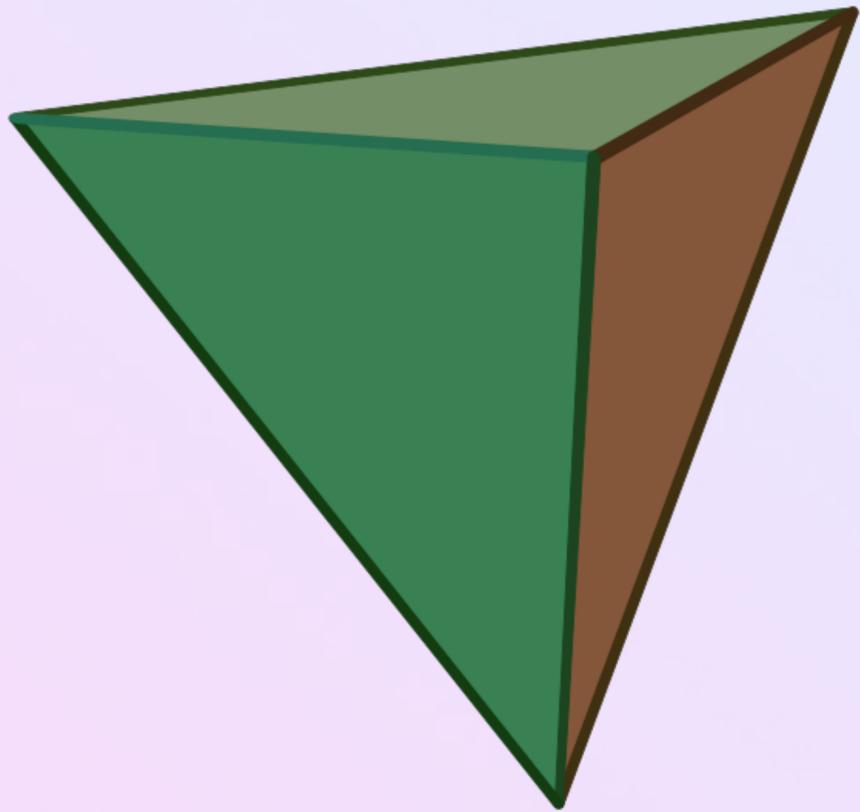
EXEMPLES

LA TOPOLOGIE NE FAIT PAS LA DIFFÉRENCE ENTRE UN CUBE ... ET UNE BOULE !



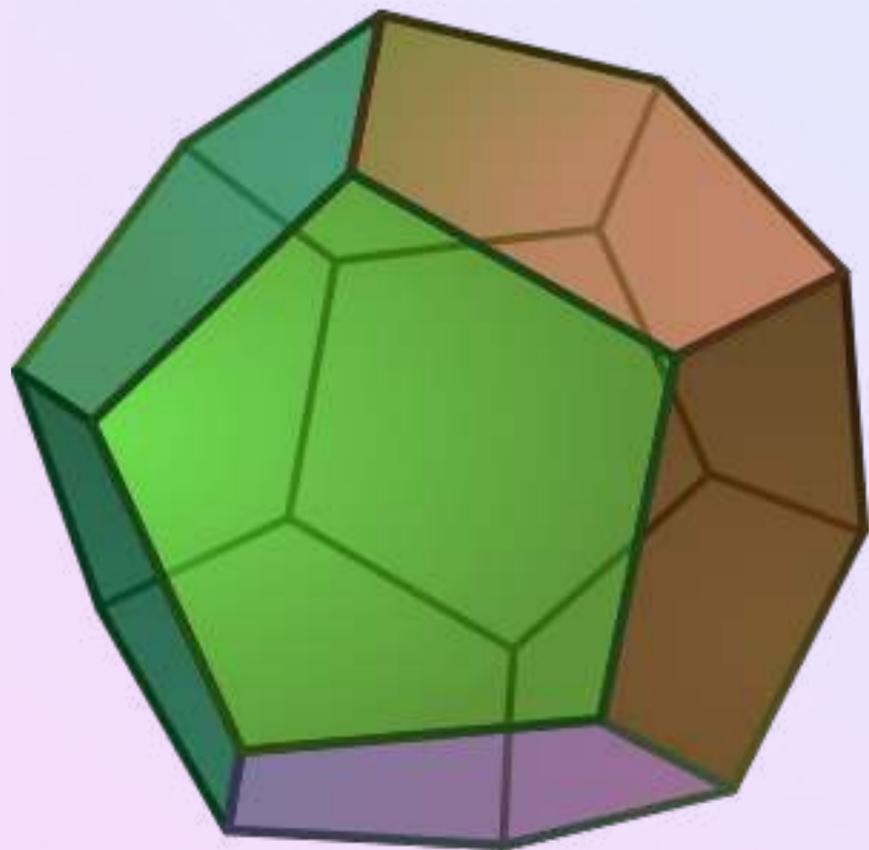
EXEMPLES

LA TOPOLOGIE NE FAIT PAS LA DIFFÉRENCE ENTRE UN **TÉTRAÈDRE** ET UNE BOULE

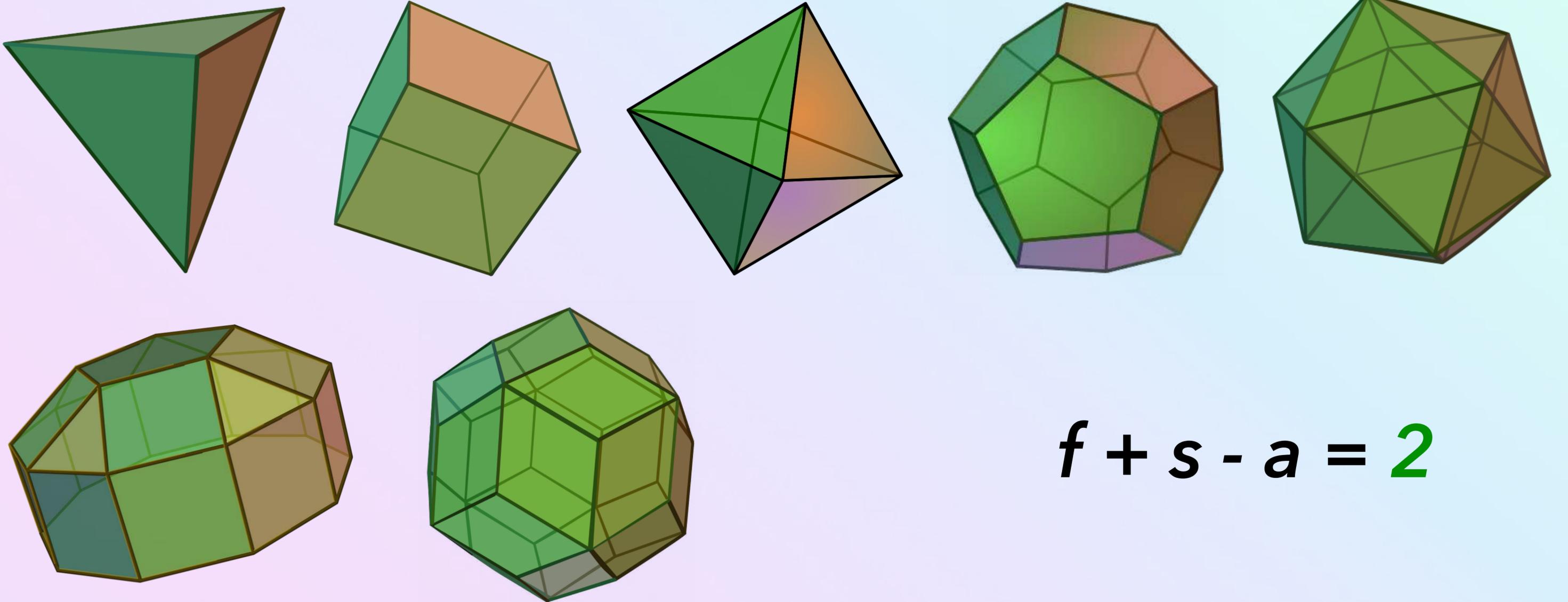


EXEMPLES

LA TOPOLOGIE NE FAIT PAS LA DIFFÉRENCE ENTRE UN DODÉCAÈDRE ET UNE BOULE

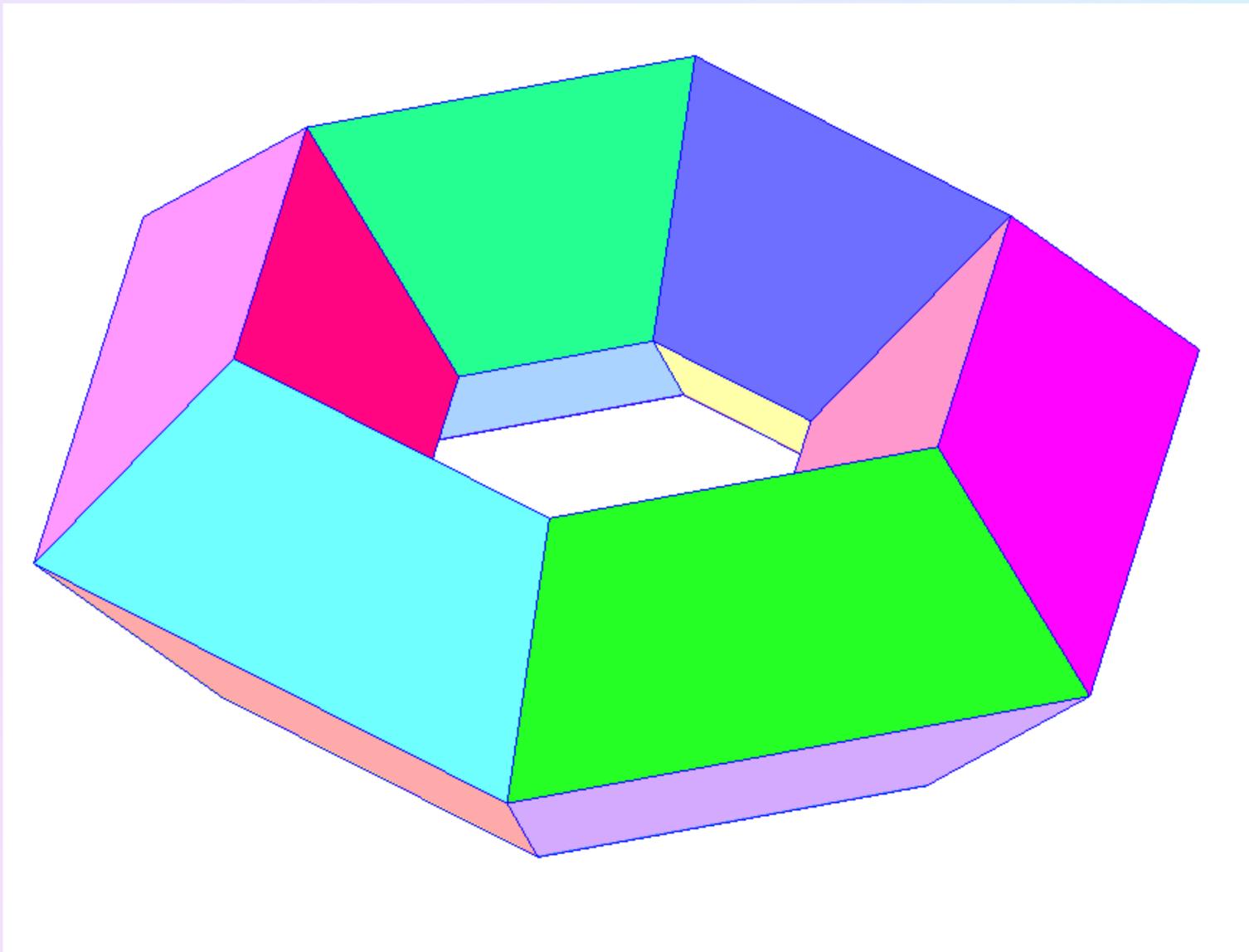


UNE CARACTÉRISTIQUE COMMUNE



$$f + s - a = 2$$

ET CELUI-CI ?



$$f = 6 \times 4 = 24$$

$$s = 6 \times 4 = 24$$

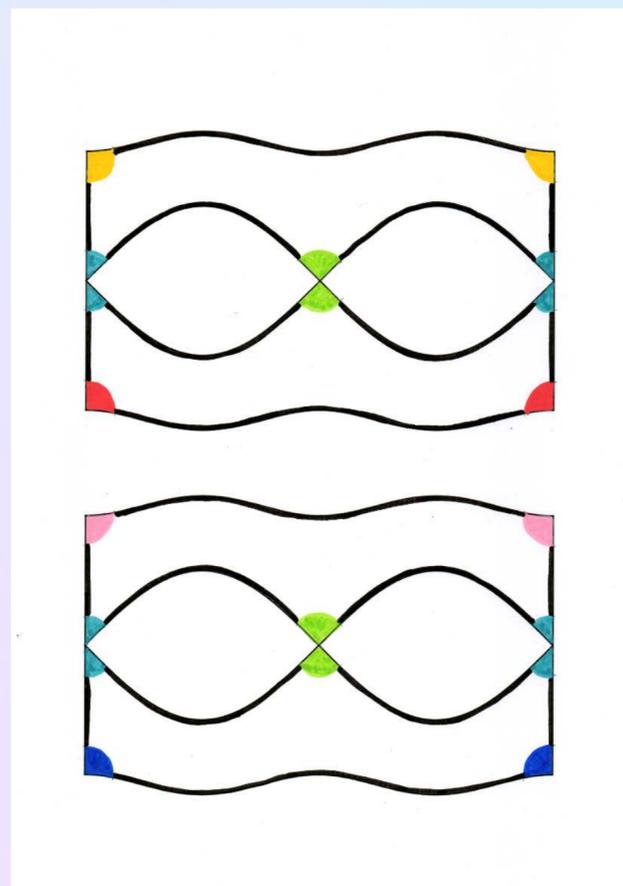
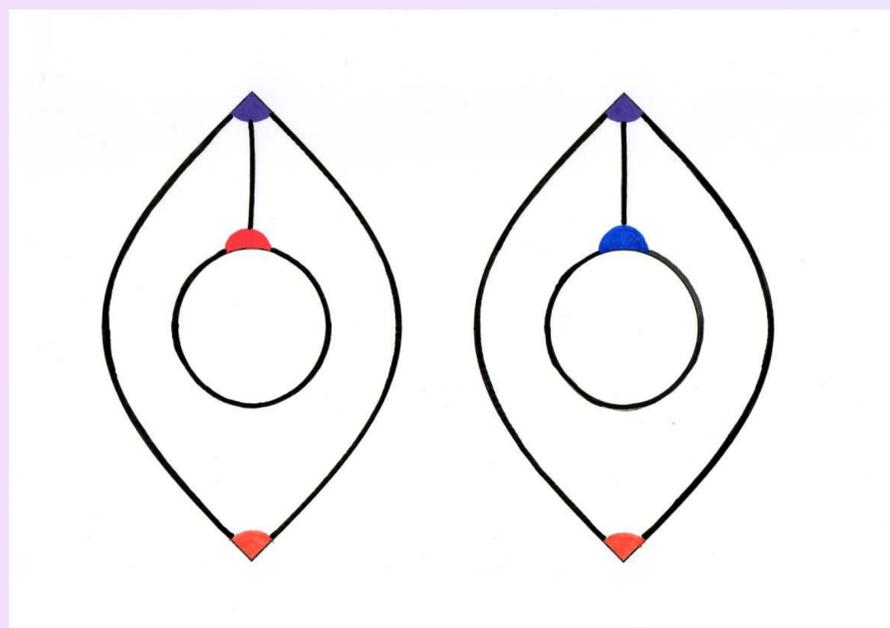
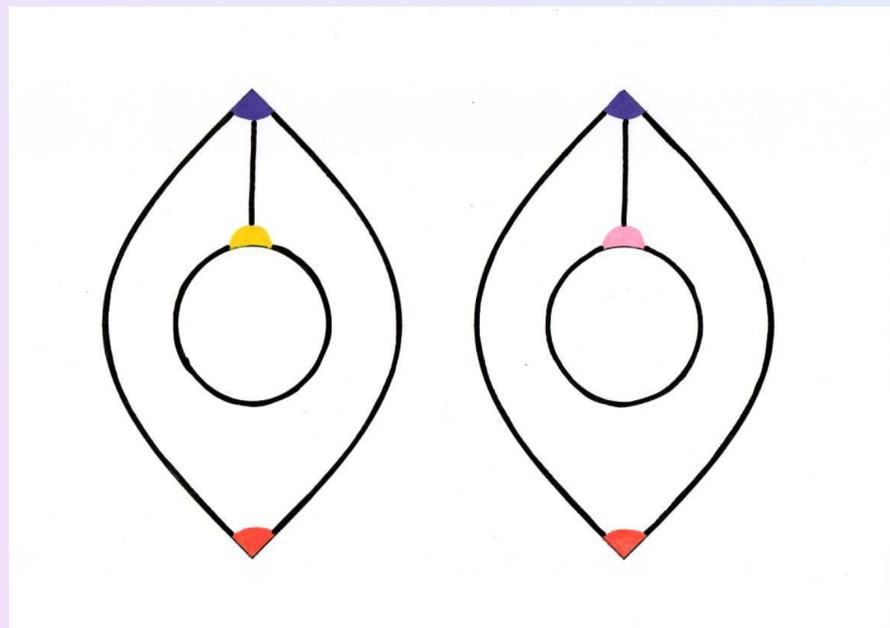
$$a = 24 \times 4 / 2 = 48$$

$$f + s - a = 0$$

LE **GENRE** DÉTERMINE LA CARACTÉRISTIQUE D'**EULER**

$$f + s - a = 2 - 2g$$

EXEMPLE SUR LE RULPIDON



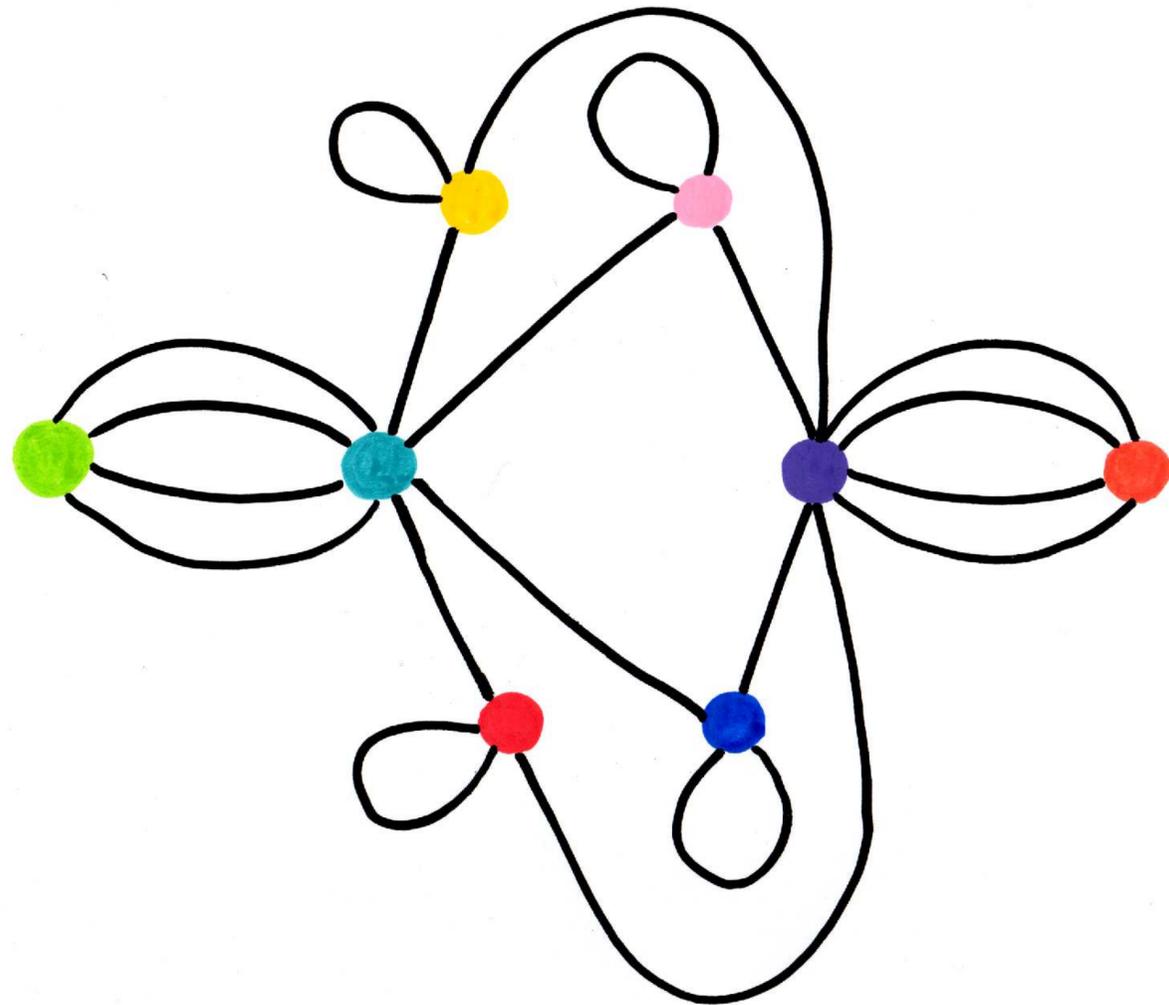
$$f = 8$$

$$s = 8$$

$$a = 20$$

$$f + s - a = -4$$

EXEMPLE SUR LA SPHÈRE



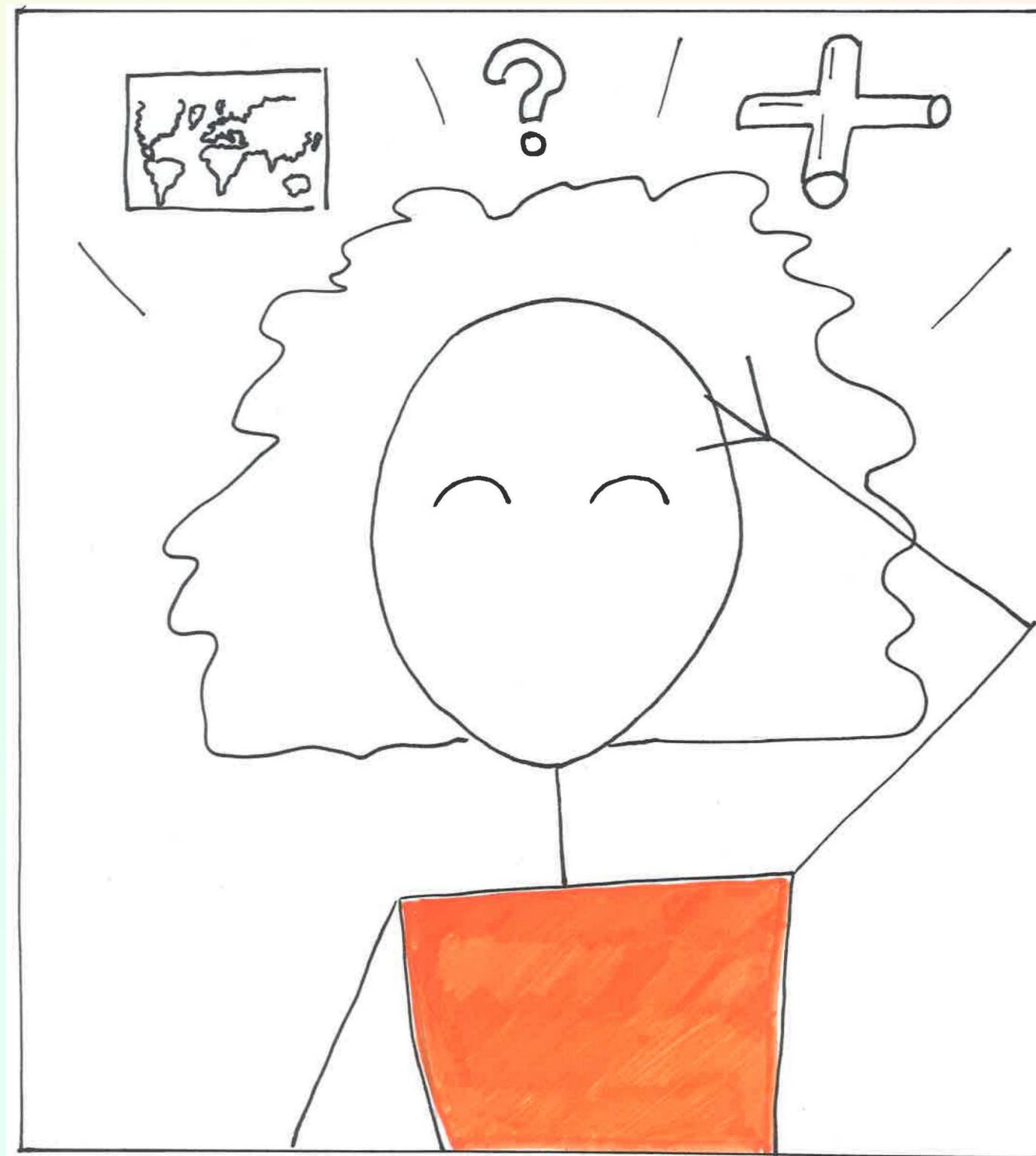
$$f = 14$$

$$s = 8$$

$$a = 20$$

$$f + s - a = 2$$

DES CARTES SUR LE RULPIDON



**LE THÉORÈME DES 4 COULEURS EST
FAUX SUR LE RULPIDON !**

THÉORÈME DES 4 COULEURS

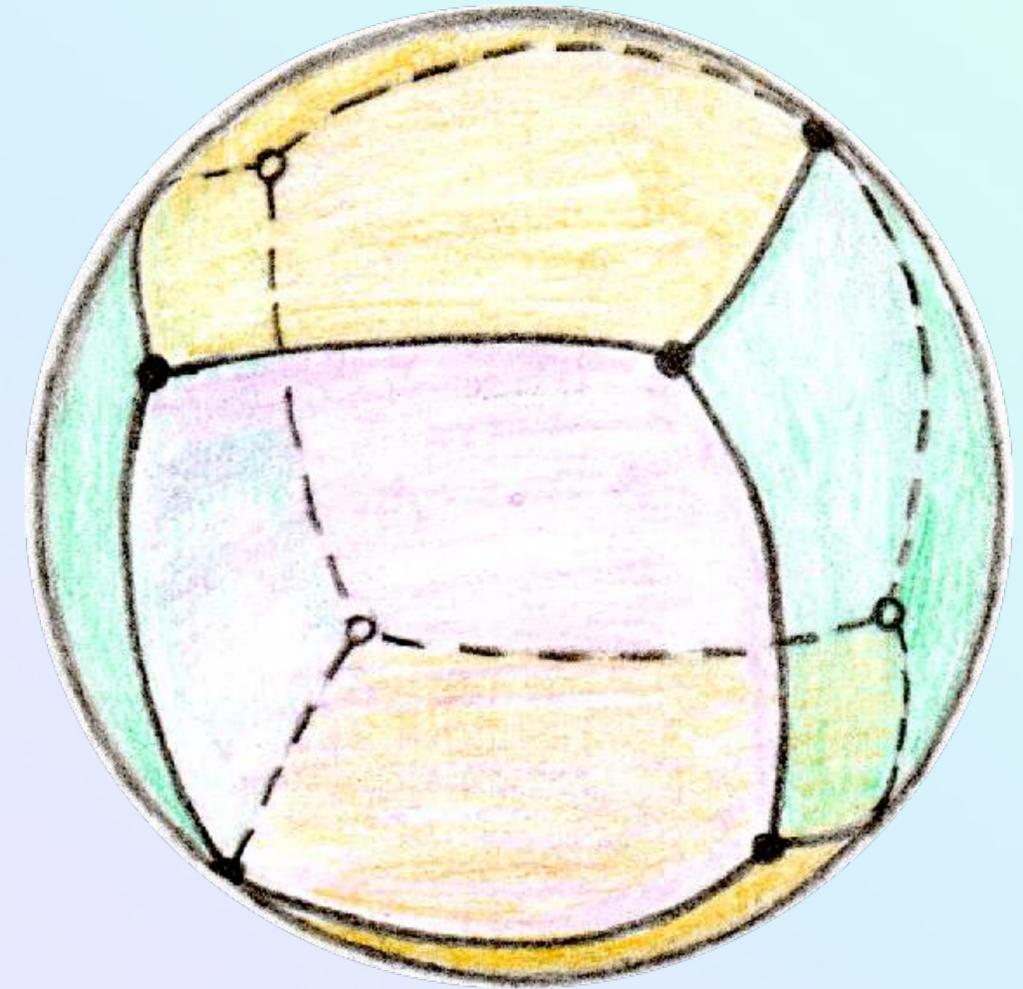
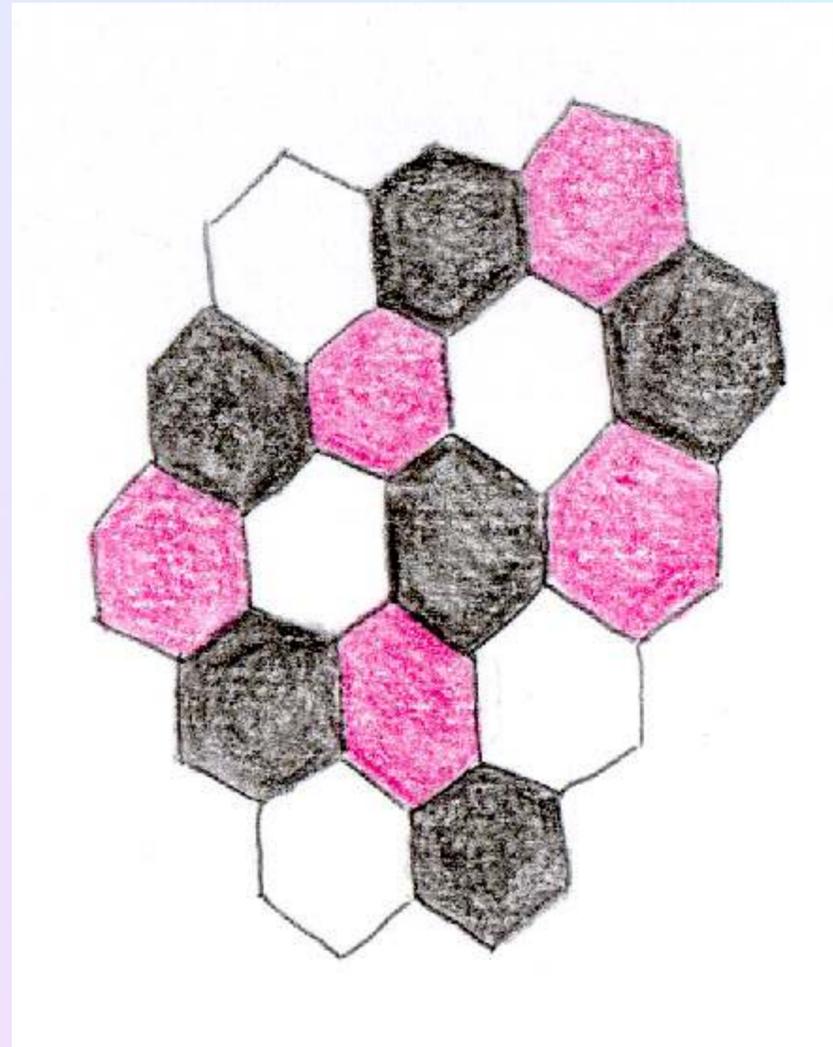
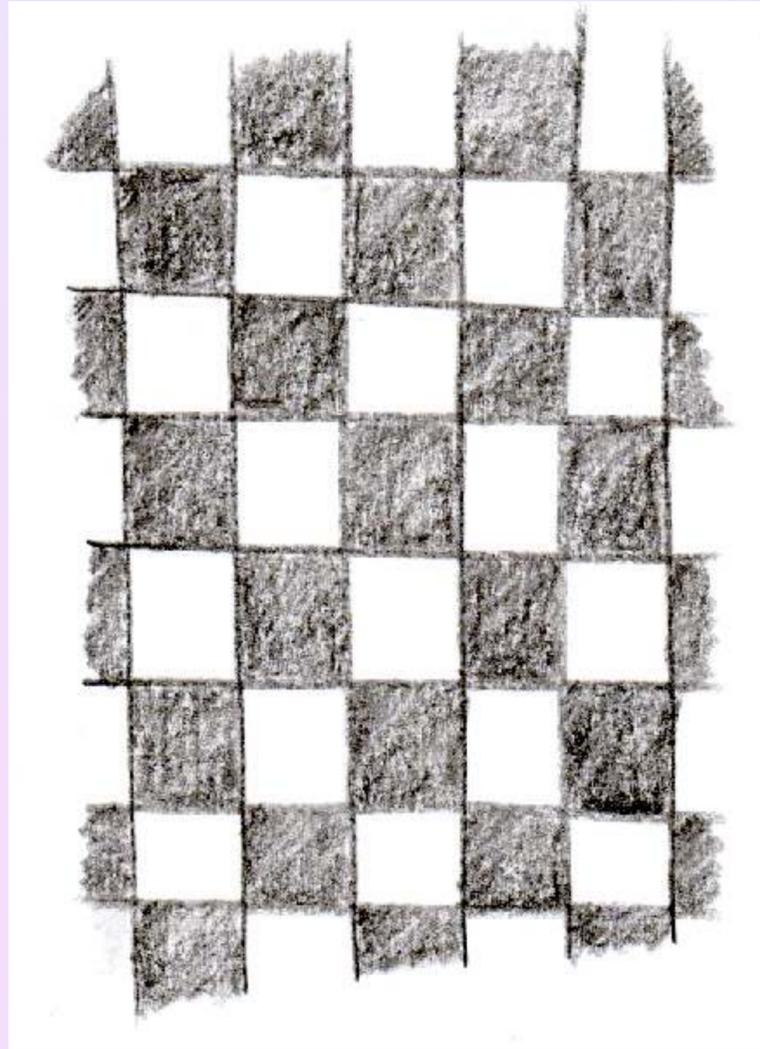
LE NOMBRE CHROMATIQUE DE LA SPHÈRE EST ÉGAL À 4

Nombre chromatique ?

C'est le plus petit nombre de couleurs permettant de colorier n'importe quelle carte de sorte que les régions frontalières soient de couleurs différentes.



CARTES MOINS GOURMANDES



LE GENRE DÉTERMINE LE NOMBRE CHROMATIQUE

$$\chi = E\left(\frac{7 + \sqrt{1 + 48g}}{2}\right)$$

GENRE 1

LE NOMBRE CHROMATIQUE VAUT 7.

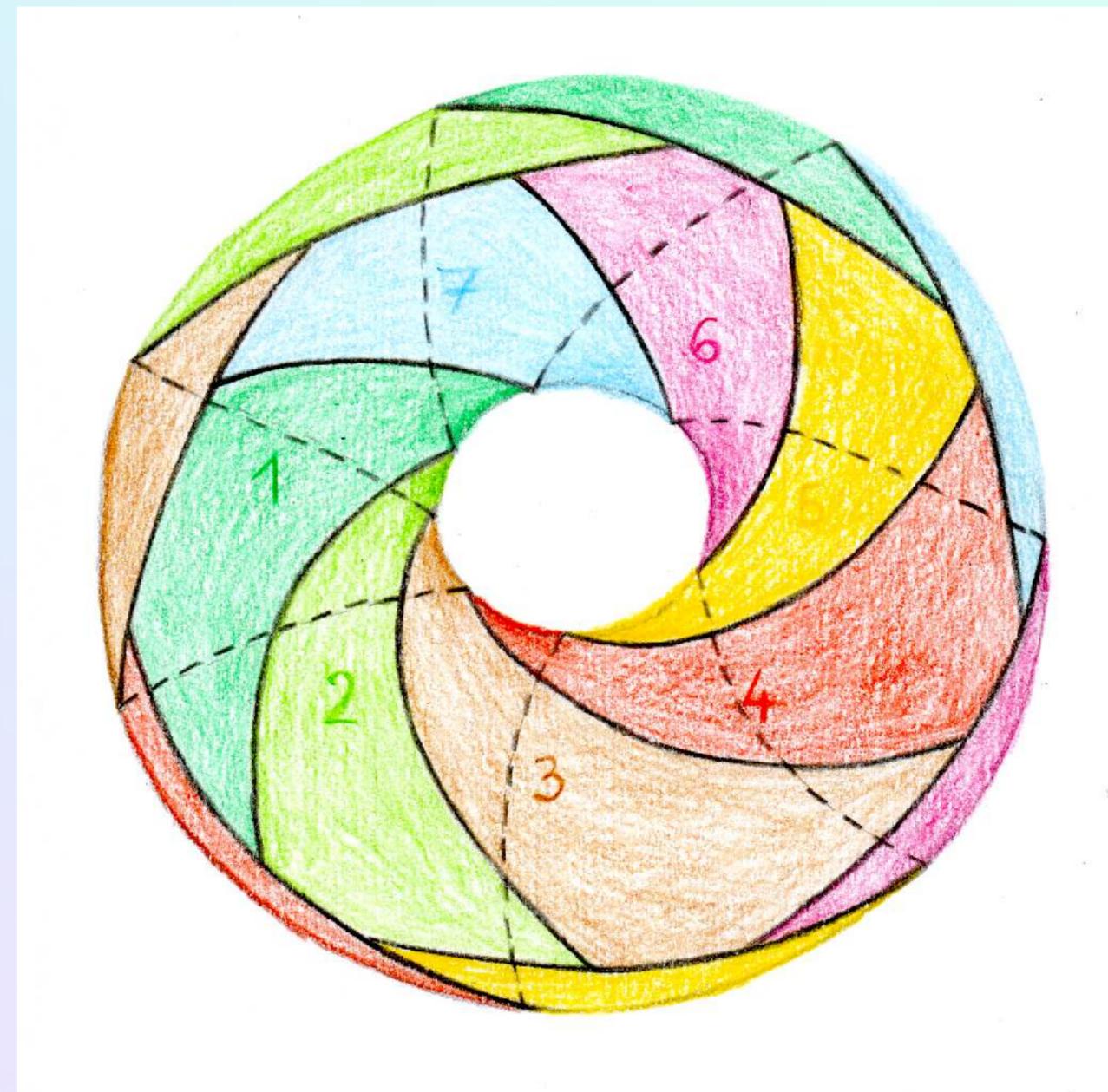
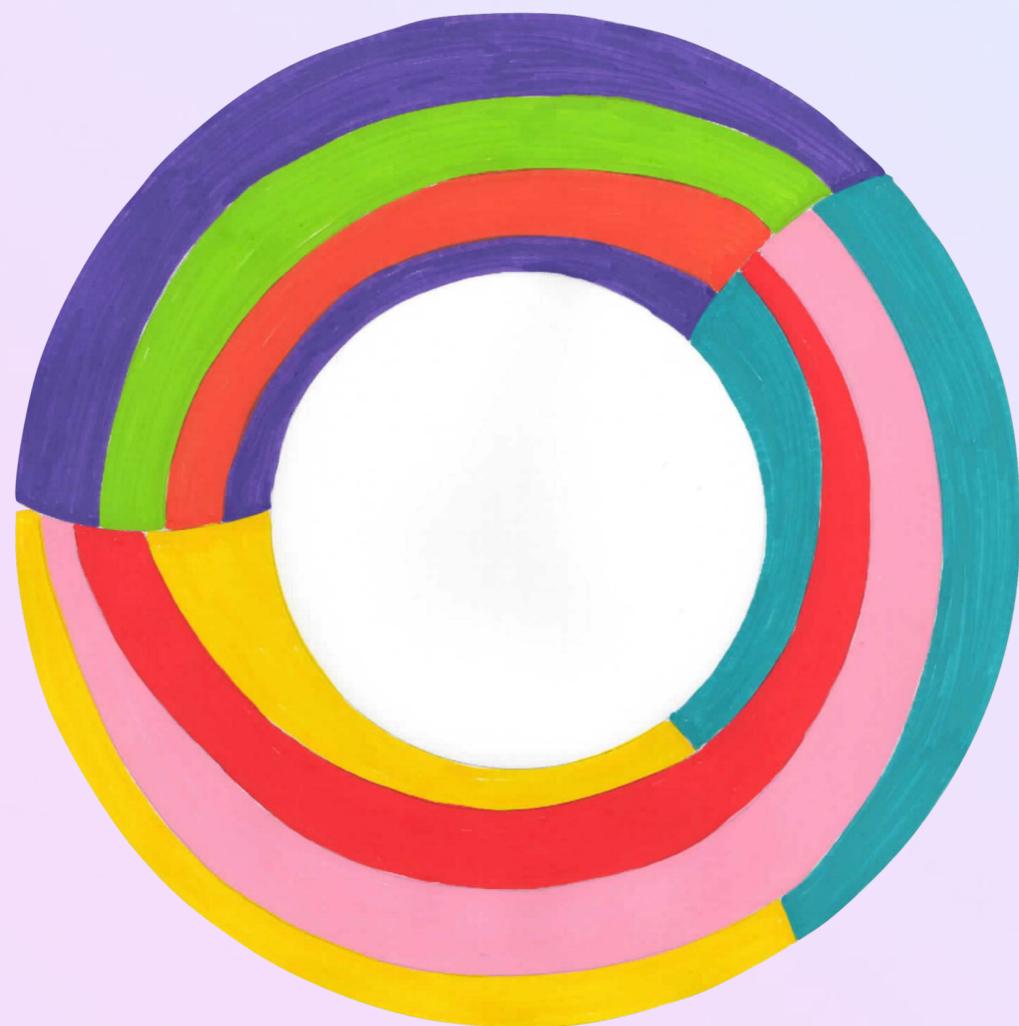


Maison Poincaré - Atrium | Espace CONNECTER ©Institut Henri Poincaré, Paris / Atelier Novembre, du&ma, Thibaut Voisin

Ceci est un exemple de **carte complète** à 7 couleurs.

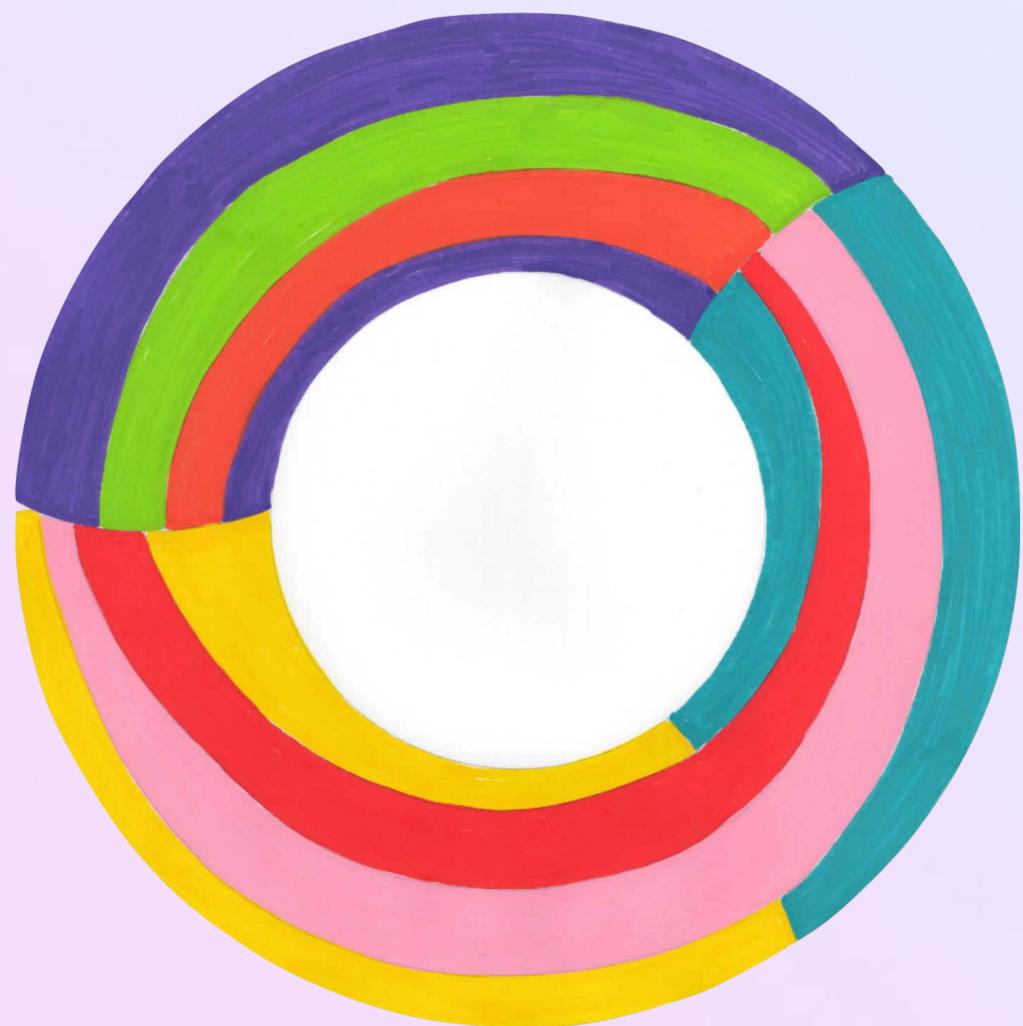
GENRE 1

LE NOMBRE CHROMATIQUE VAUT 7.

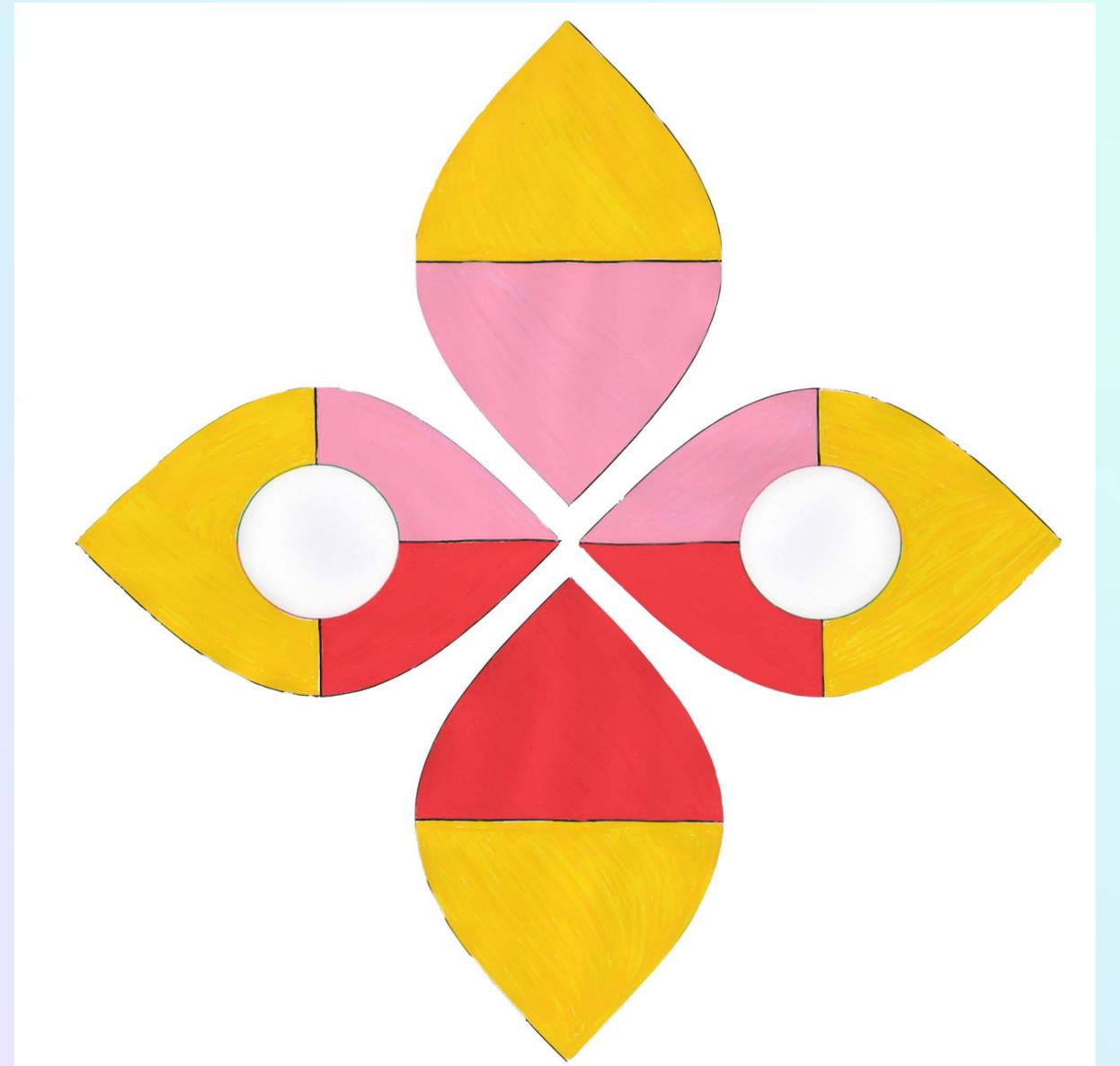
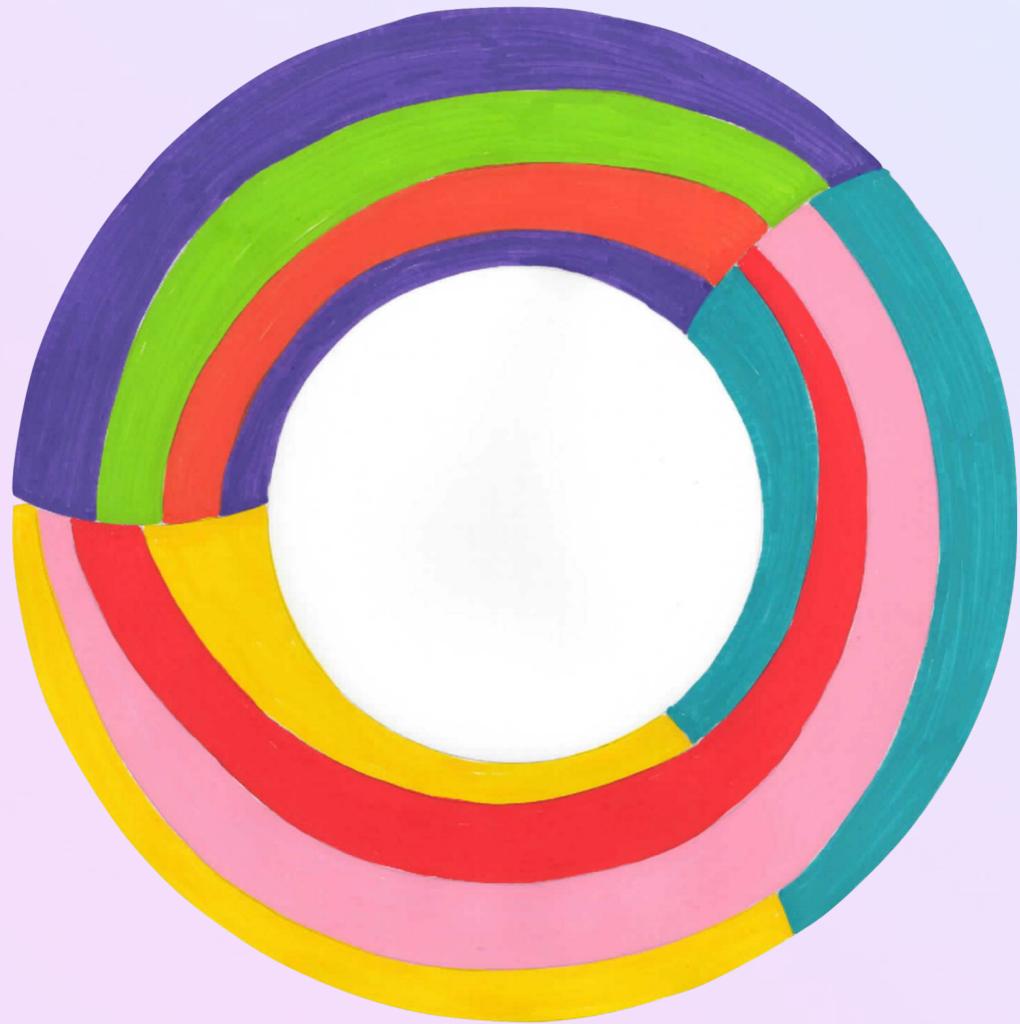


Ce sont deux exemples de **carte complète** à 7 couleurs.

GENRE 1

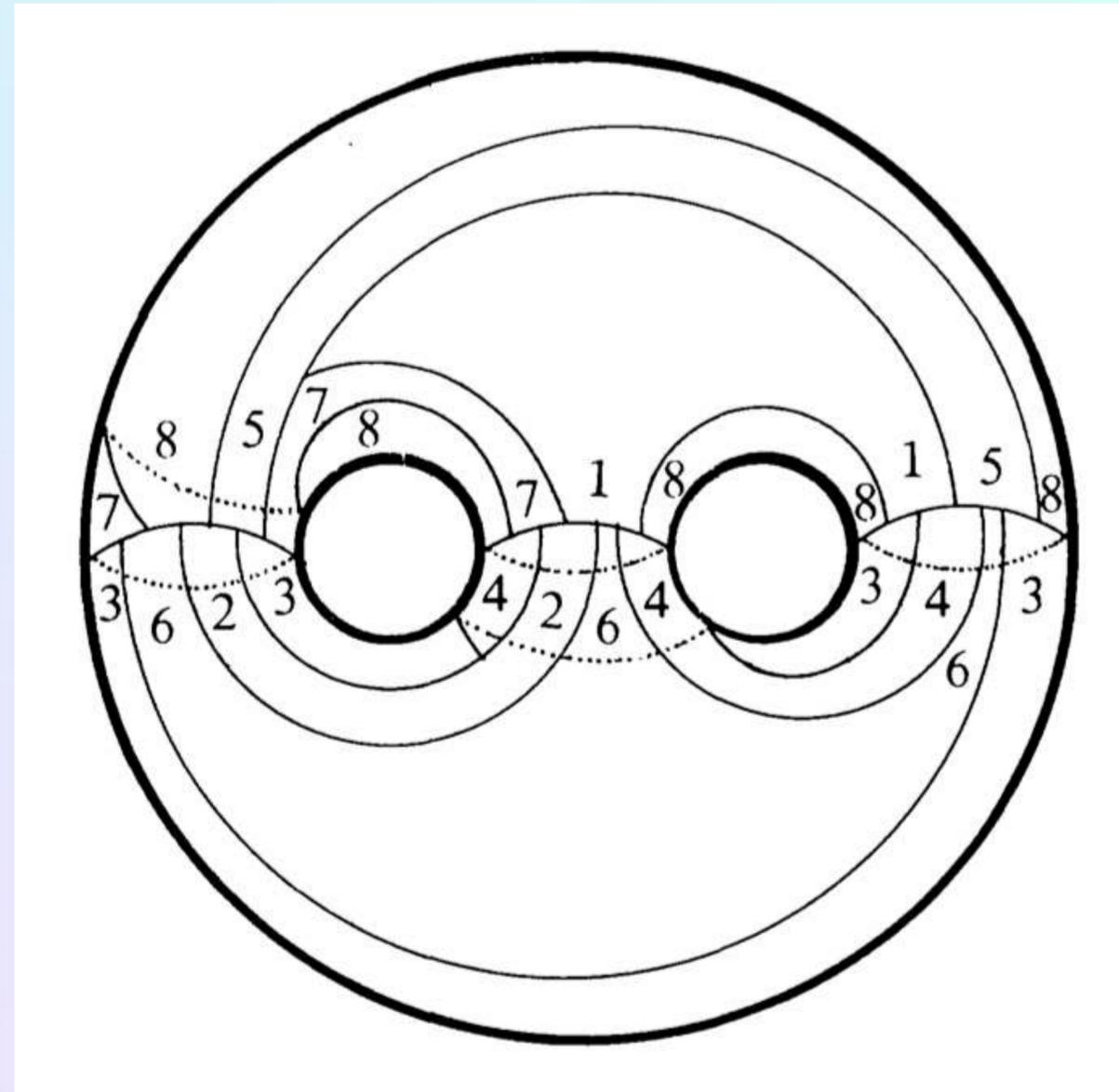
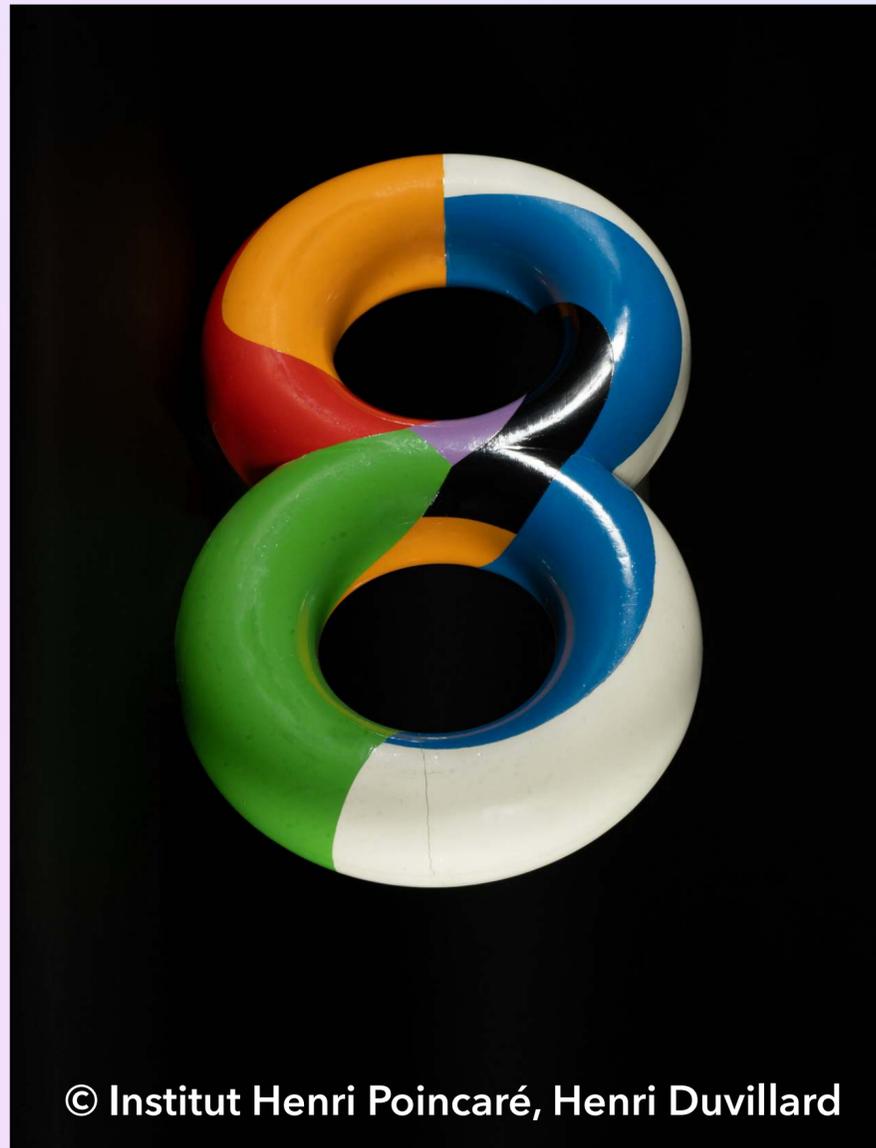


GENRE 1



GENRE 2

LE NOMBRE CHROMATIQUE VAUT 8.

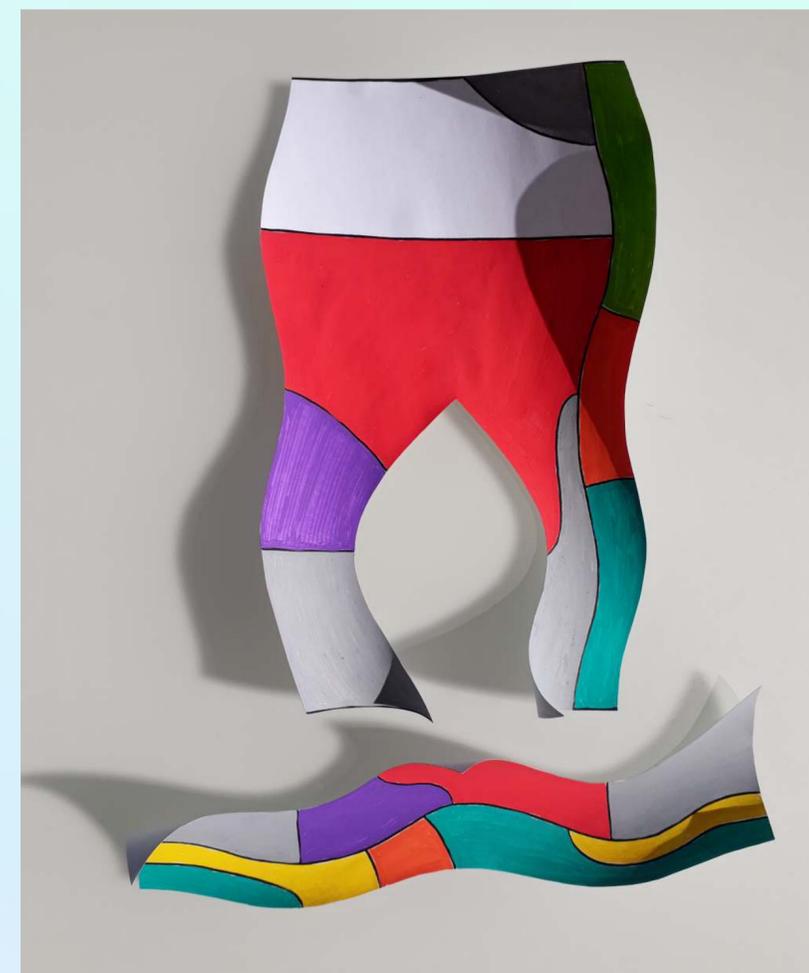
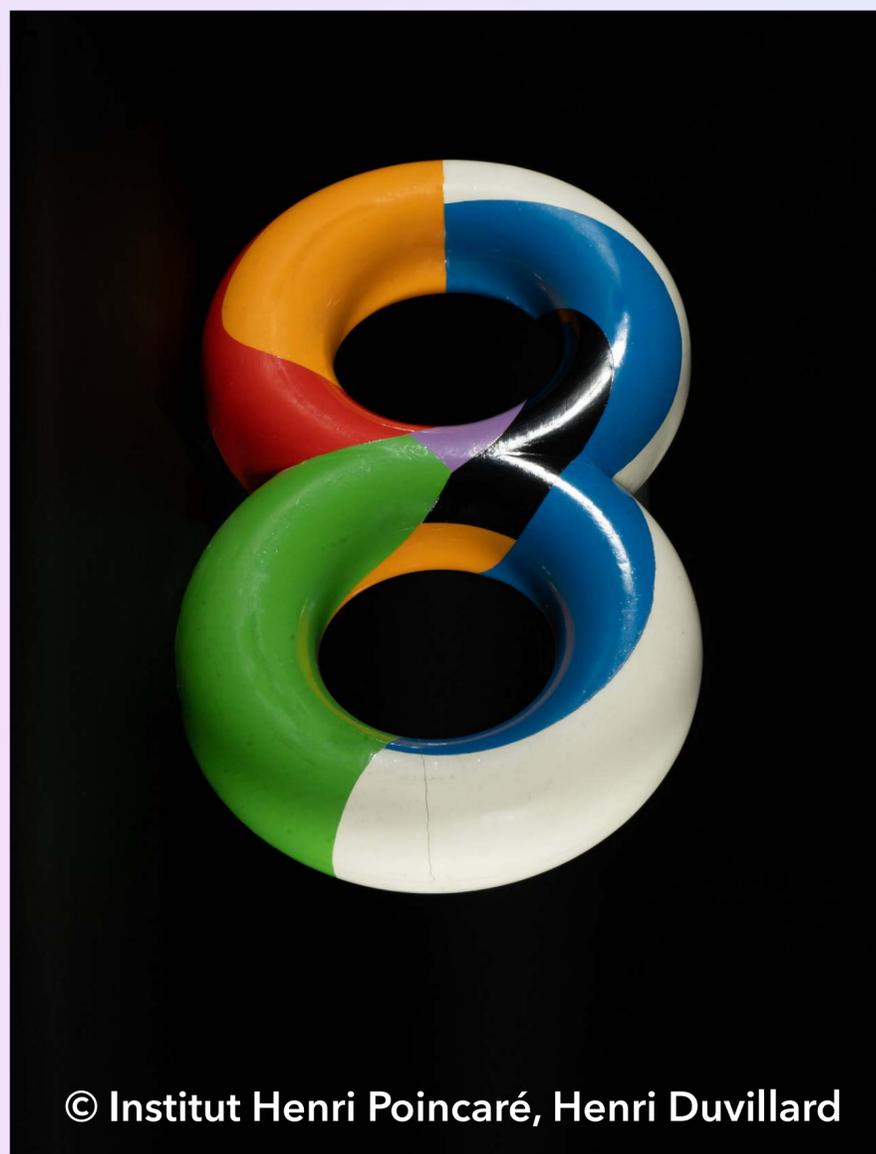


© Stahl, Mathematics magazine 1985

Ce sont deux exemples de **carte complète** à 8 couleurs.

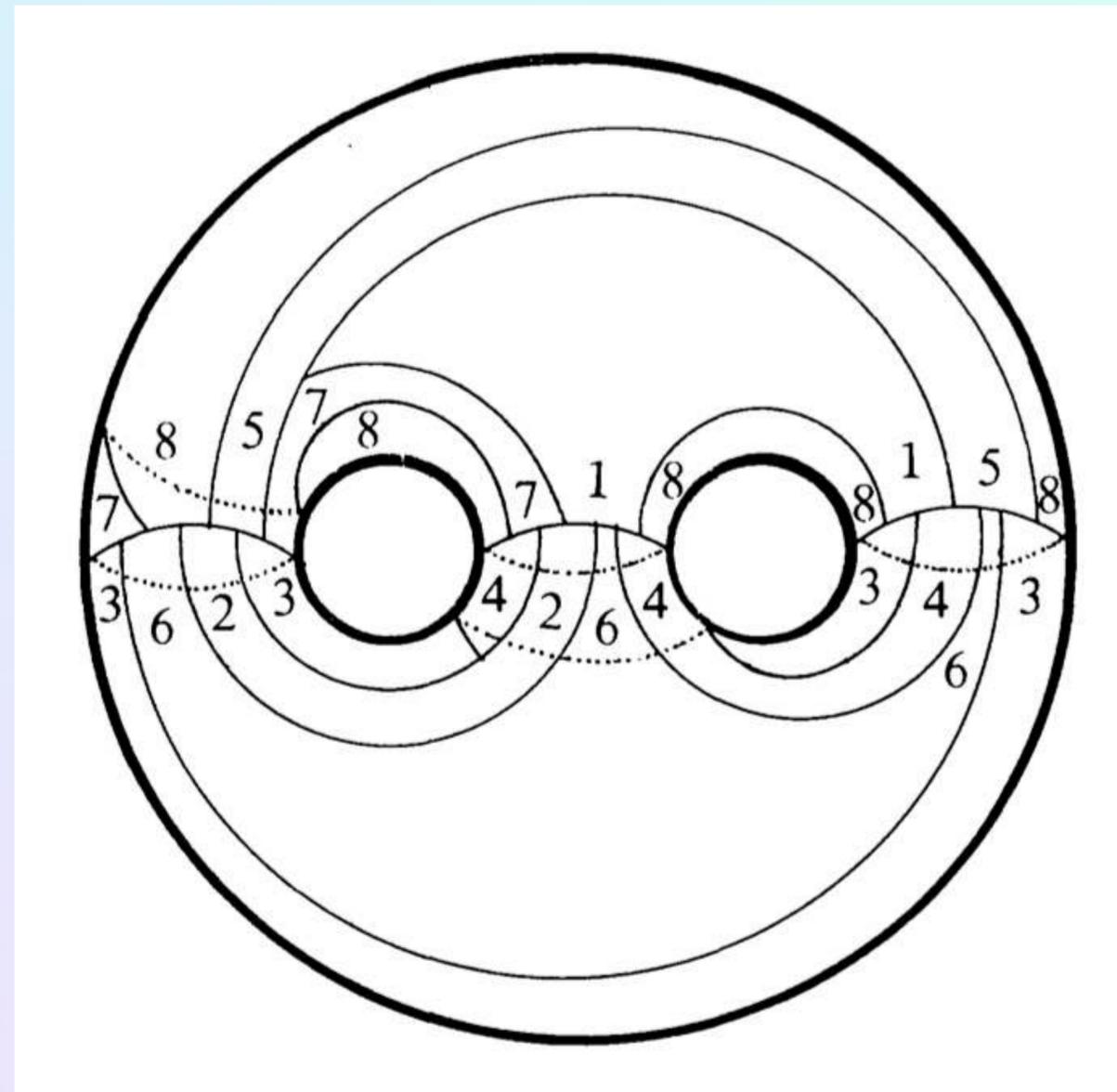
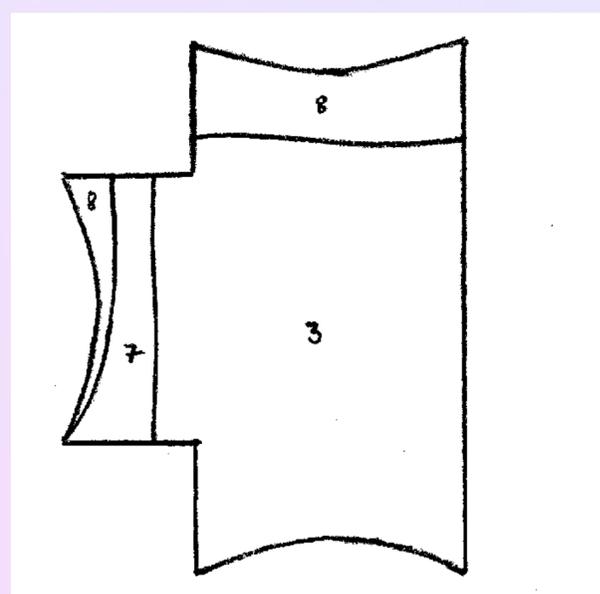
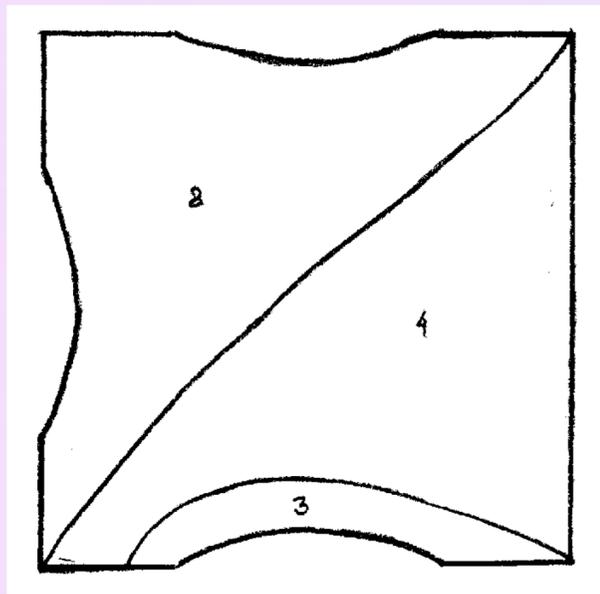
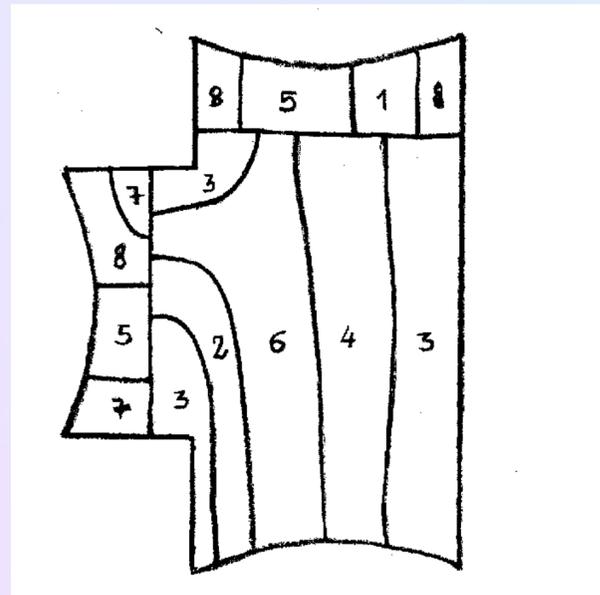
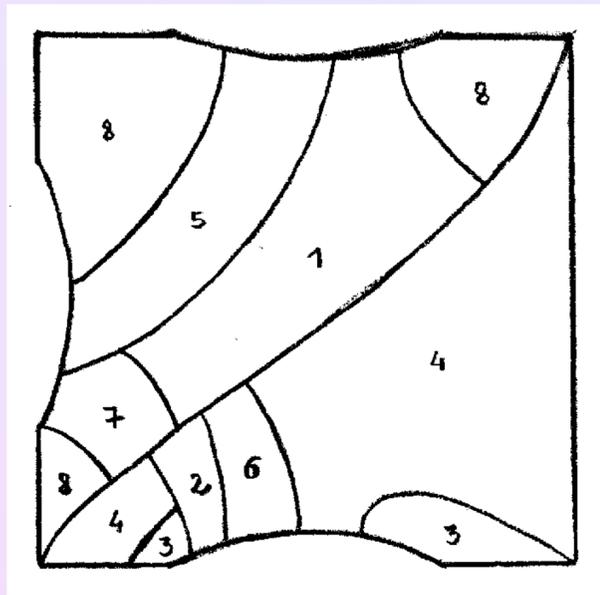
GENRE 2

LE NOMBRE CHROMATIQUE VAUT 8.



Ce sont deux exemples de **carte complète** à 8 couleurs.

GENRE 2



© Stahl, Mathematics magazine 1985

GENRE 3

LE NOMBRE CHROMATIQUE VAUT 9.



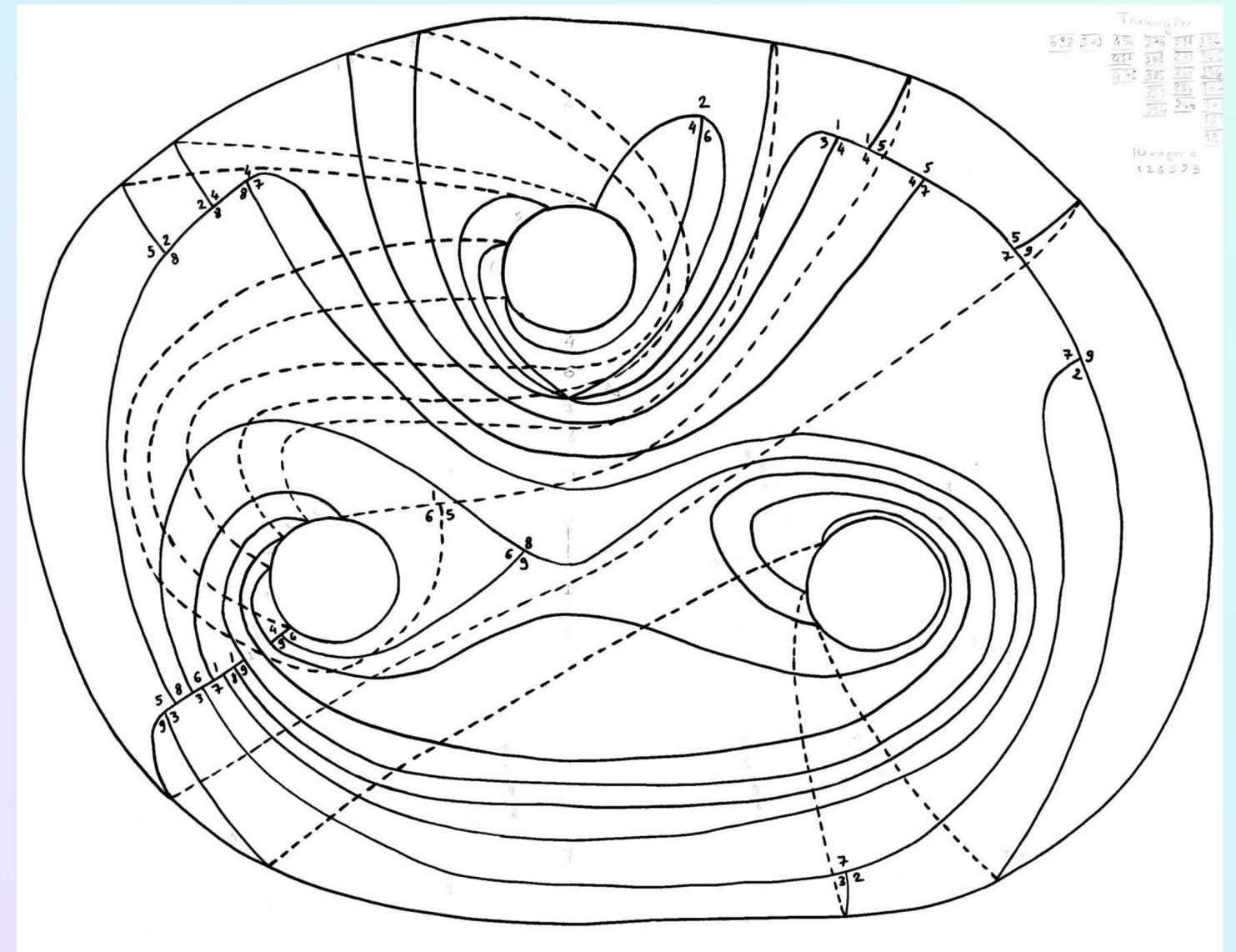
Ceci est un exemple de **carte complète** à 9 couleurs.

ET SUR LE RULPIDON ALORS ?

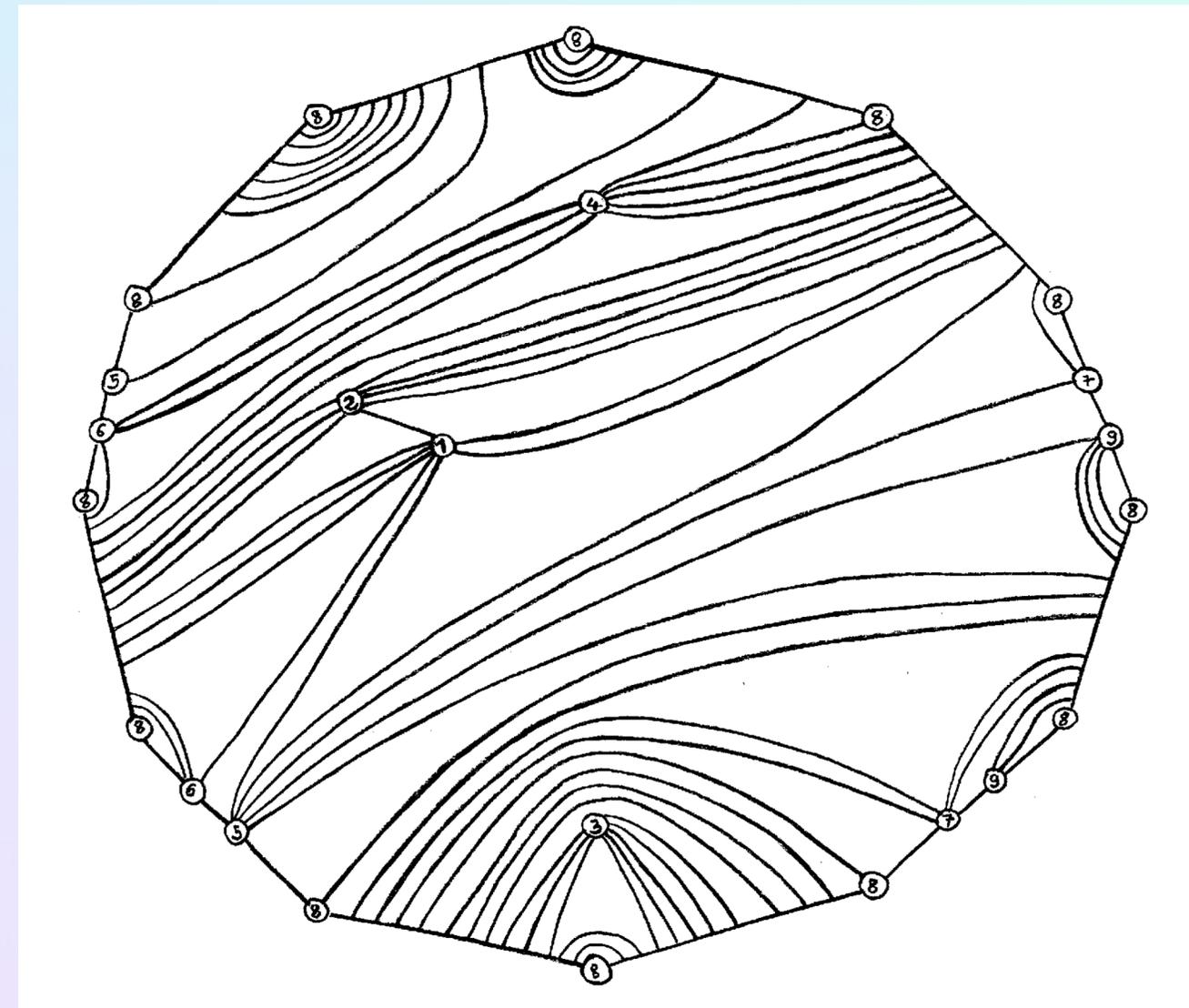
CARTE MOINS GOURMANDE



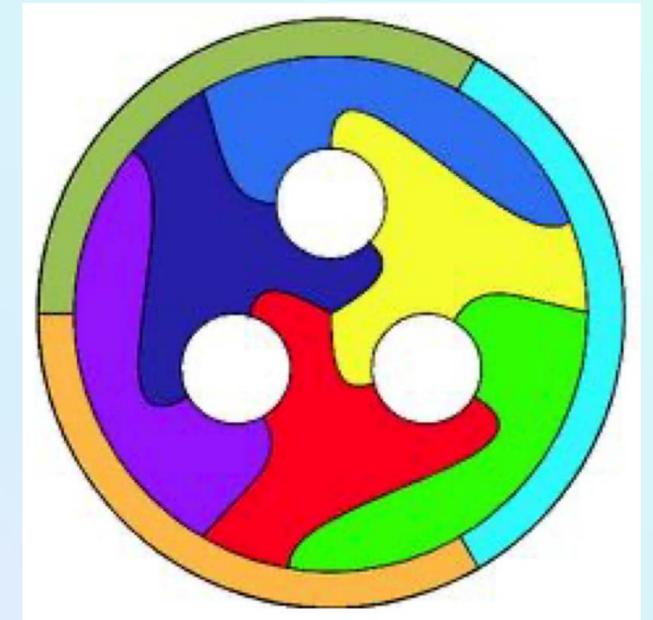
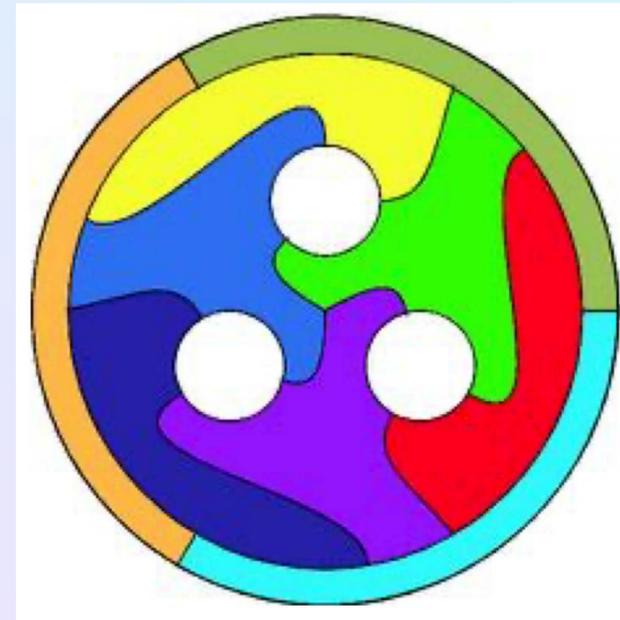
UN 1ER RULPIDON ENNEACHROME



UN 1ER RULPIDON ENNEACHROME



UN 2ND RULPIDON ENNEACHROME



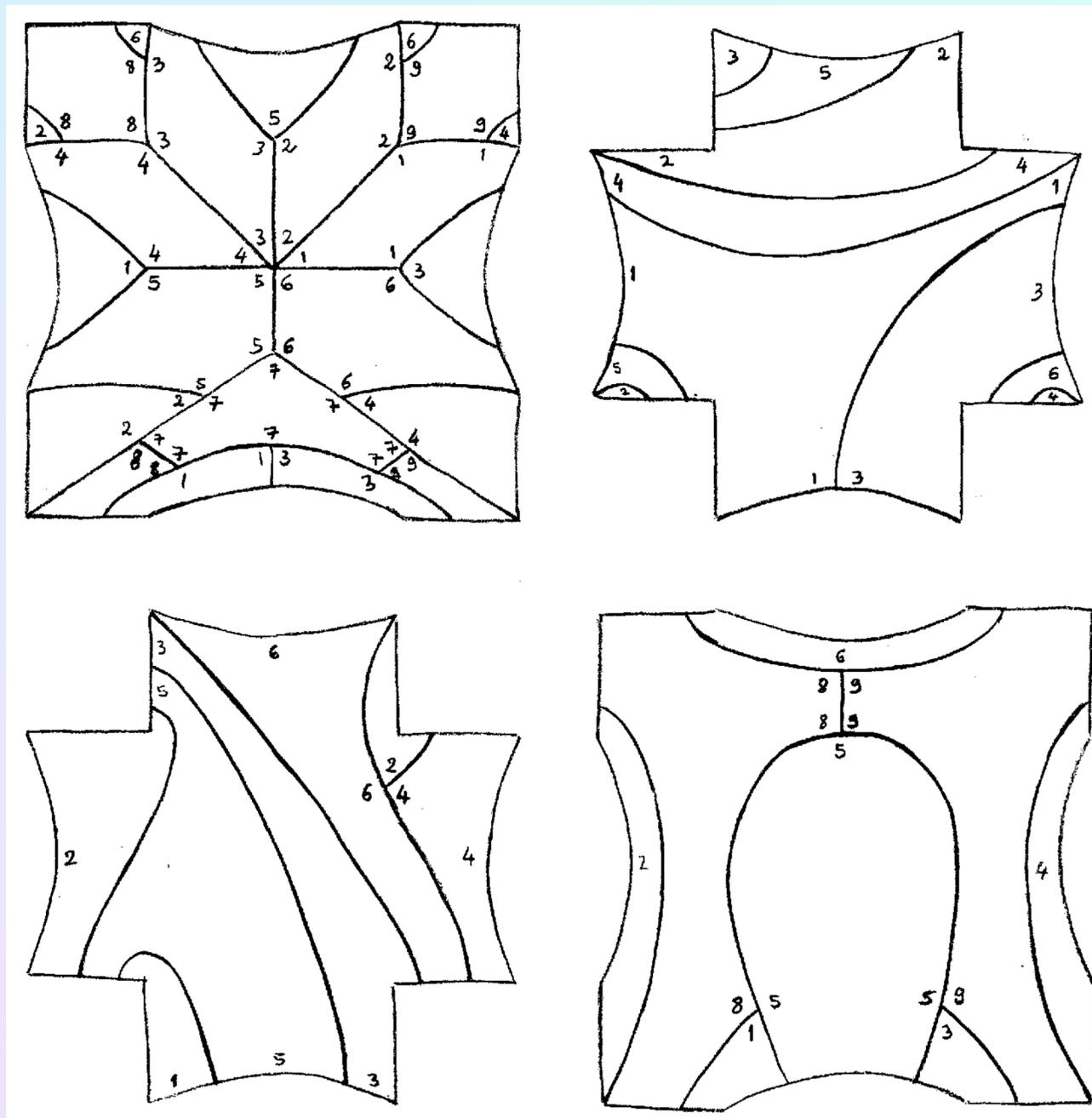
© Carlo Séquin

UN 3ÈME RULPIDON ENNEACHROME



RULPIDON ENNEACHROME FINAL

UNE CARTE COMPLÈTE 9 COULEURS INTELLIGIBLE



POUR EN SAVOIR PLUS



<https://math.univ-lyon1.fr/~benzoni/Rulpidon.html>