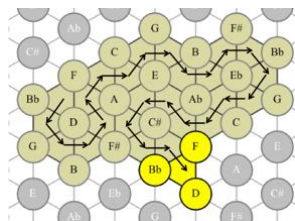
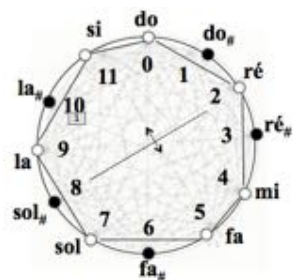


Et si on faisait des maths à partir de la musique ?



TFJM² Strasbourg
8 avril 2018

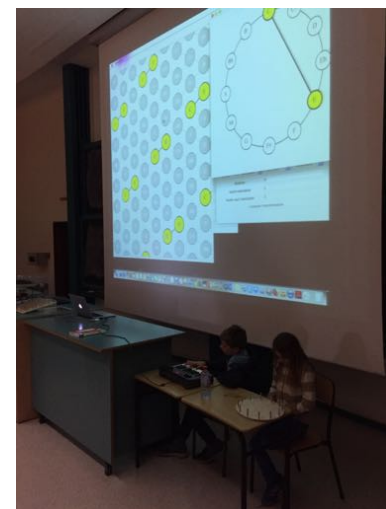
Moreno Andreatta

Equipe Représentations Musicales

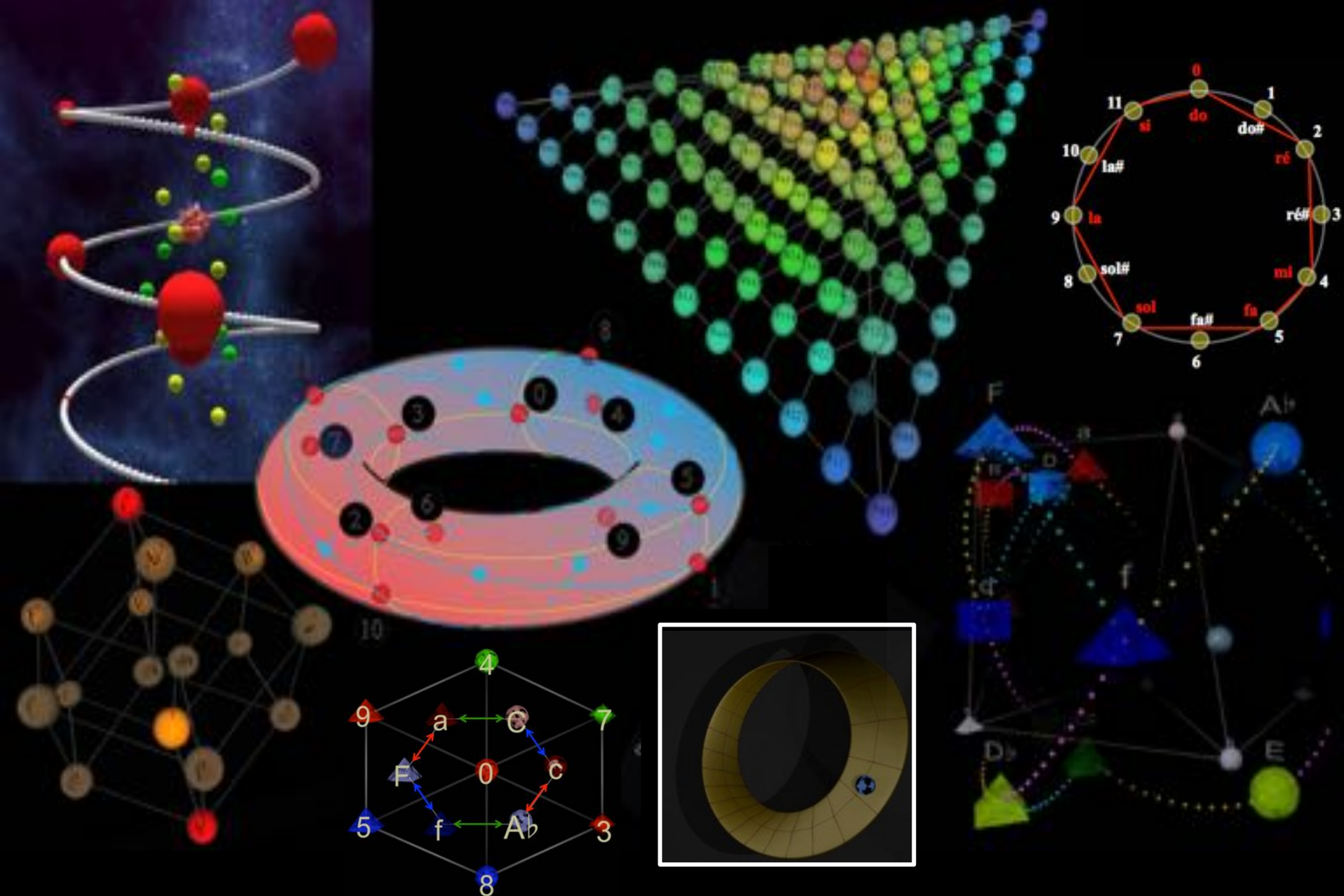
IRCAM / CNRS UMR 9912 / Sorbonne Université

IRMA & GREAM, Université de Strasbourg

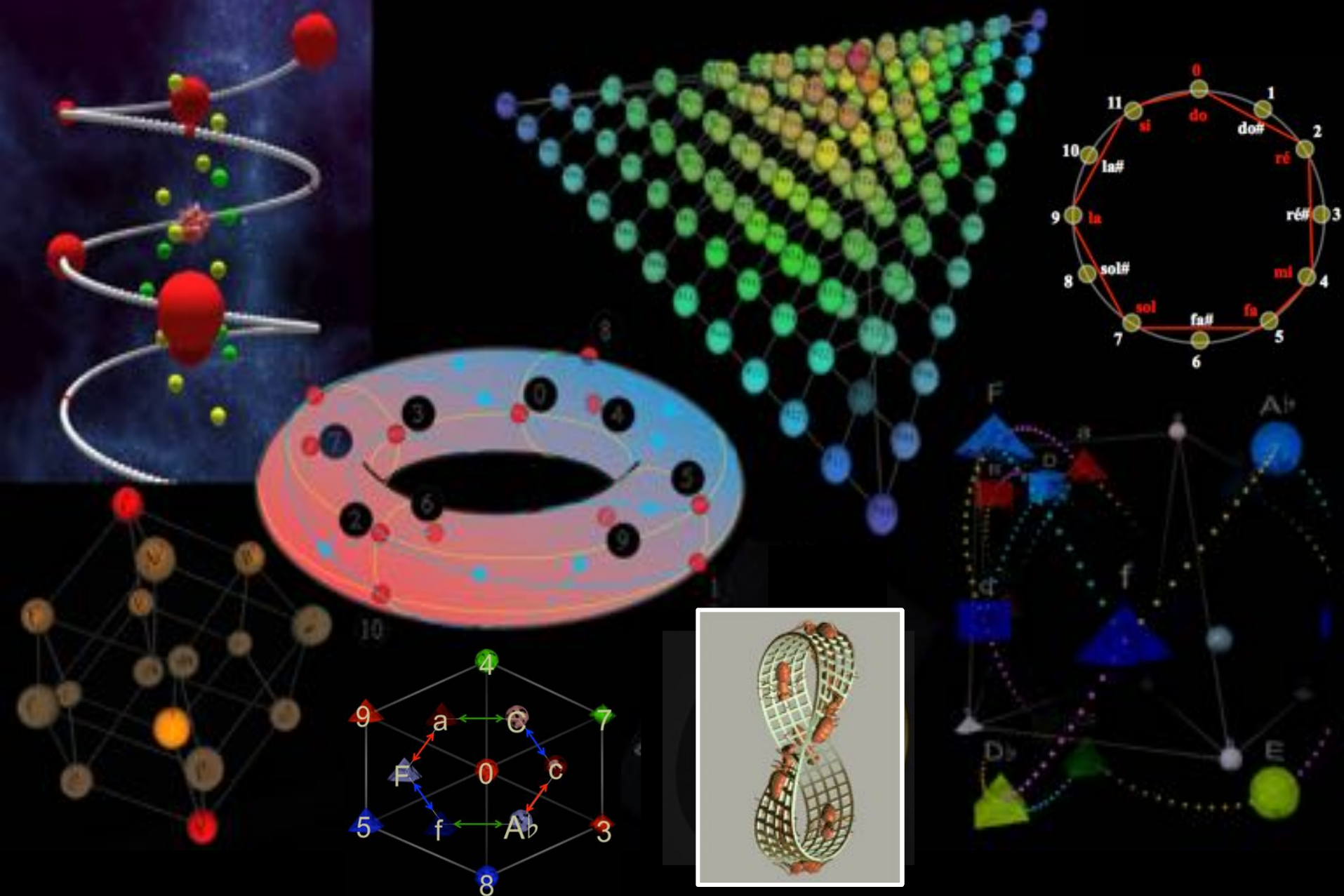
(avec la complicité de Julio et Kiara Andreatta)



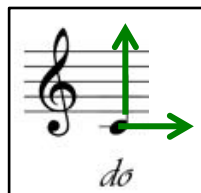
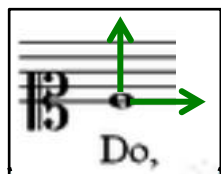
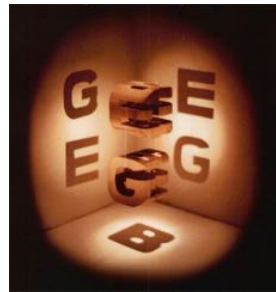
La galaxie des modèles géométriques au service de la musique



La galaxie des modèles géométriques au service de la musique

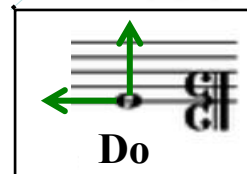


Canons énigmatiques chez Bach et géométrie

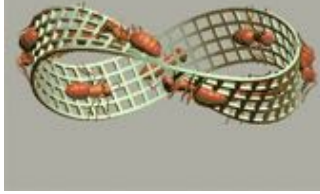


Canones diversi
super thema regium

1. Canon a 2



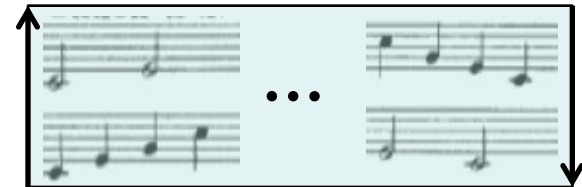
Ma fin est mon début (mais renversé !)



Canones diversi super thema regium



Canones diversi super thema regium

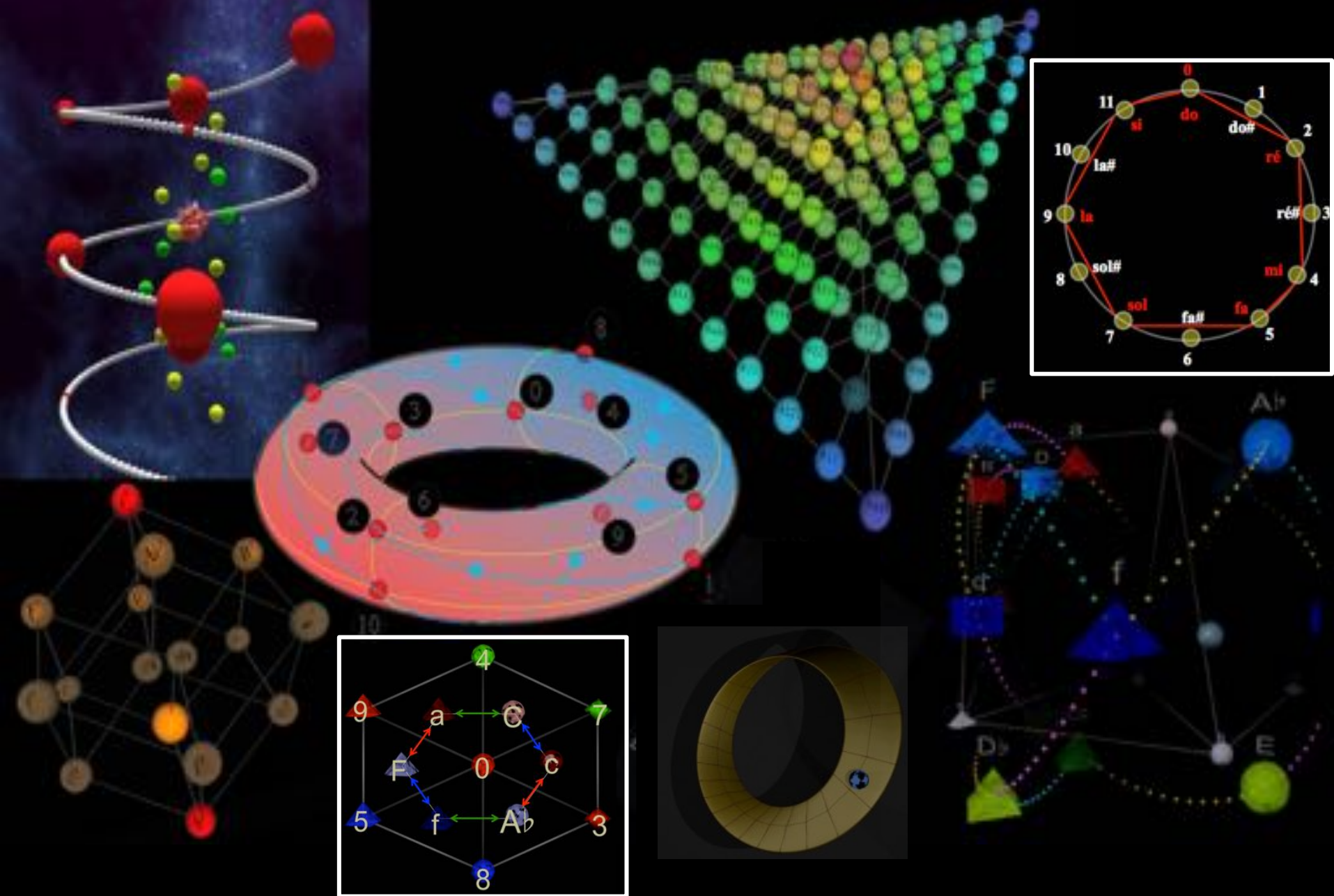




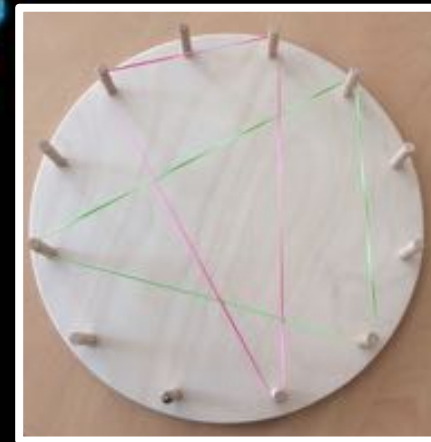
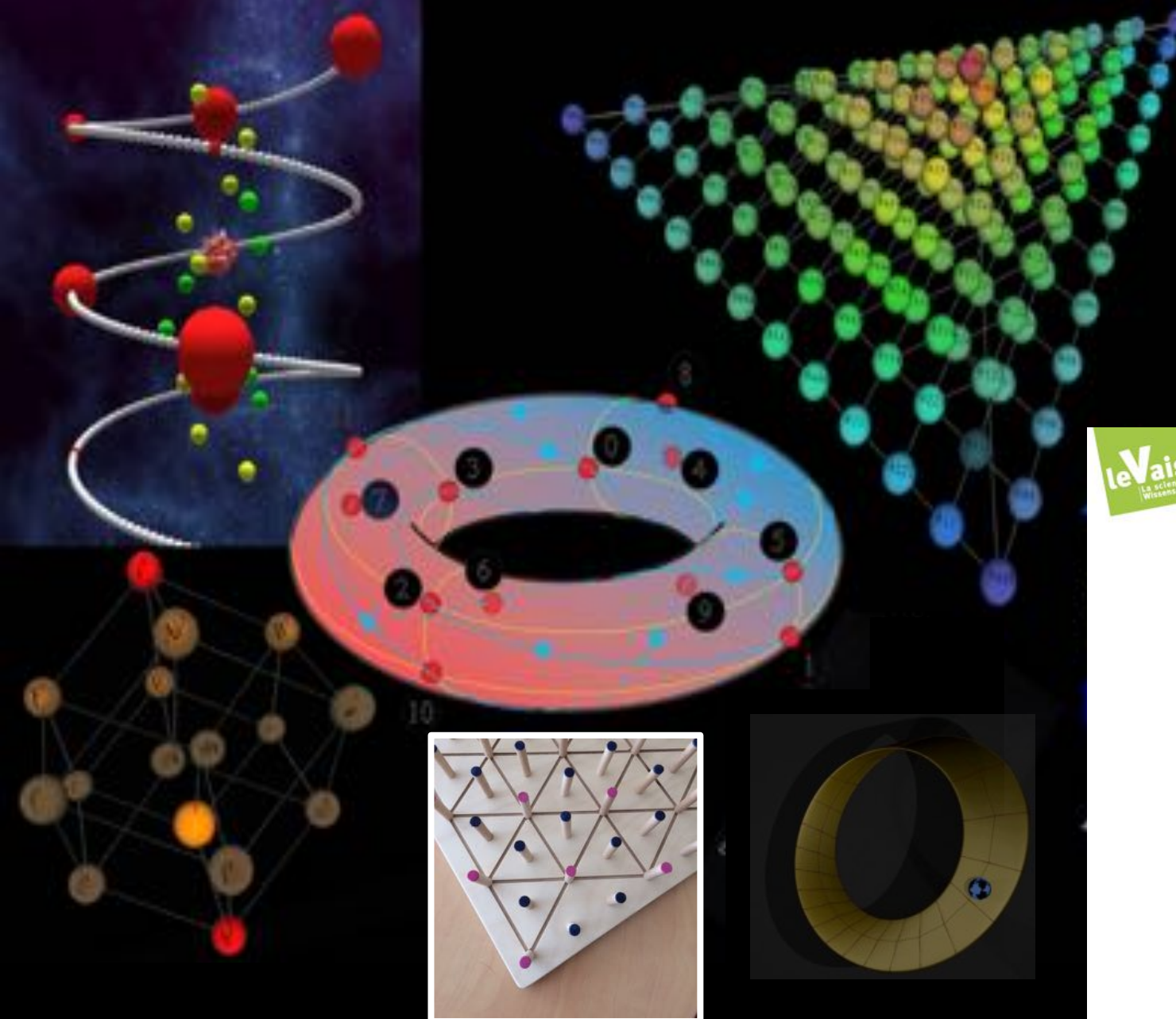
➔ <https://www.youtube.com/watch?v=xUHQ2ybTejU>



La galaxie des modèles géométriques au service de la musique



La galaxie des modèles géométriques au service de la musique



leVaisseau
la science en s'amusant
Wissenschaft macht Spaß

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CONFÉRENCE JUNIOR
SCIENCE À CROQUER

DESSINE-MOI LA MUSIQUE

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DE 17H À 18H

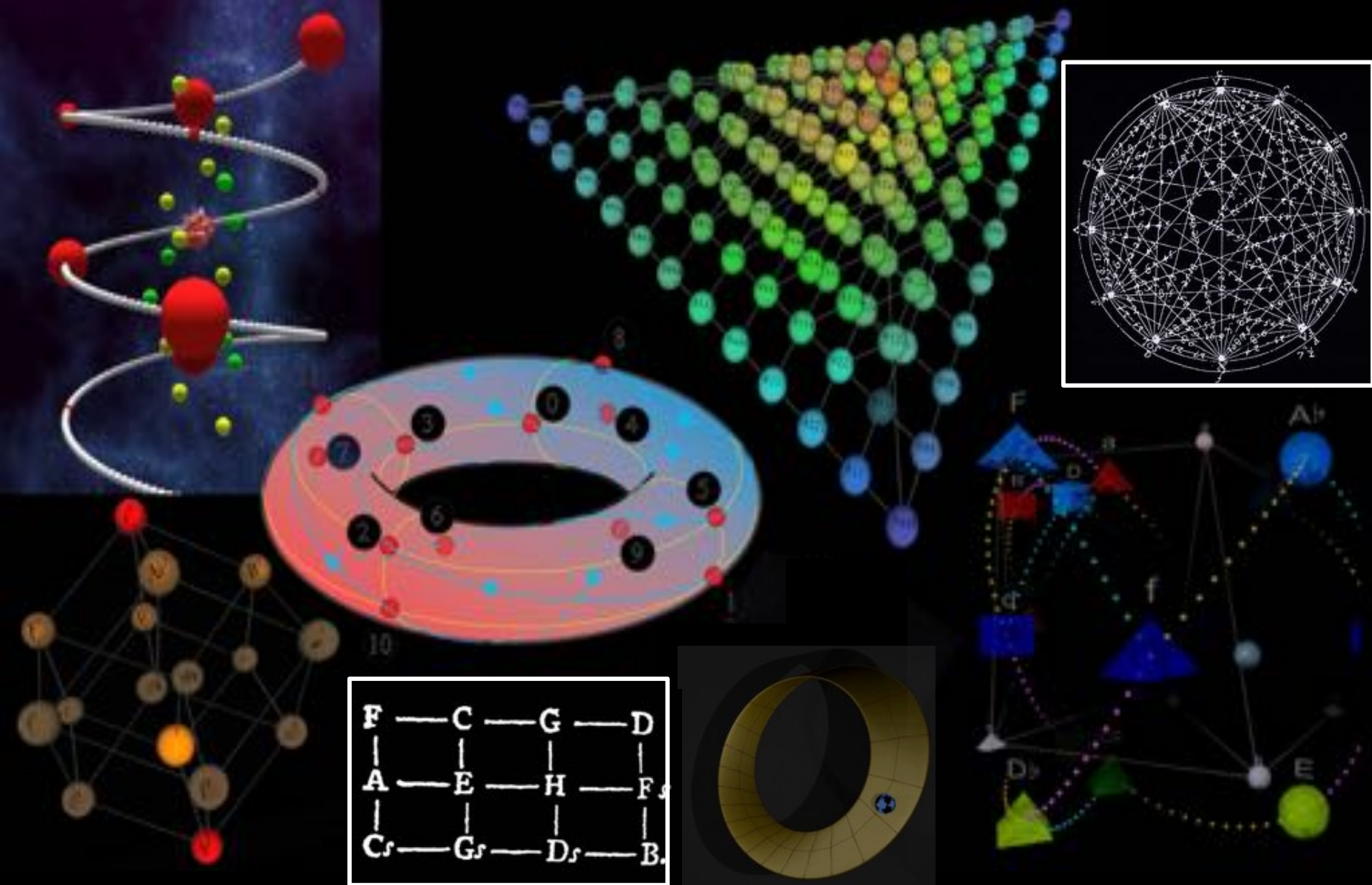
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Wissenschaft macht Spaß

La galaxie des modèles géométriques au service de la musique



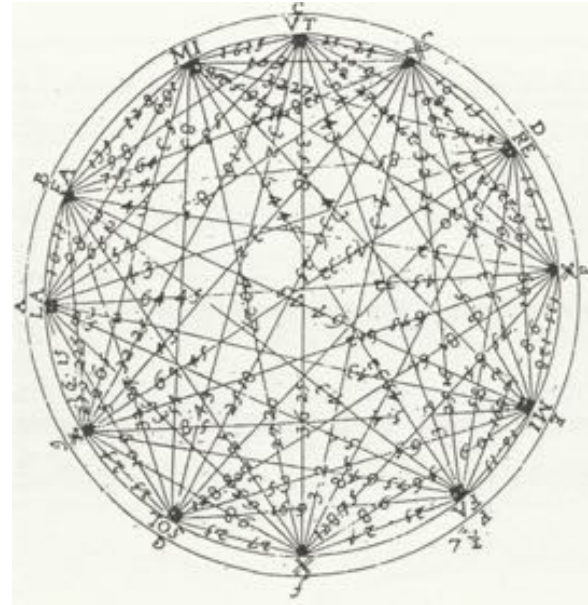
Mersenne et la naissance de la combinatoire

II 4. Marin Mersenne, *Harmonicorum Libri XII*, 1648

LIBER SEPTIMVS. DE CANTIBVS, SEV CANTILENIS, EARVMQ; NVMERO, PARTIBVS, ET SPECIEBVS.

Tabula Combinationis ab 1 ad 22.

I	1
II	1
III	6
IV	24
V	110
VI	710
VII	5040
VIII	40310
IX	361880
X	3618800
XI	39916800
XII	479001600
XIII	6127016800
XIV	87178120000
XV	1307674568000
XVI	20911789888000
XVII	315687418096000
XVIII	6401373705718000
XIX	11164810040881000
XX	2431301008176640000
XXI	5090941871709440000
XXII.	1114000717777607680000



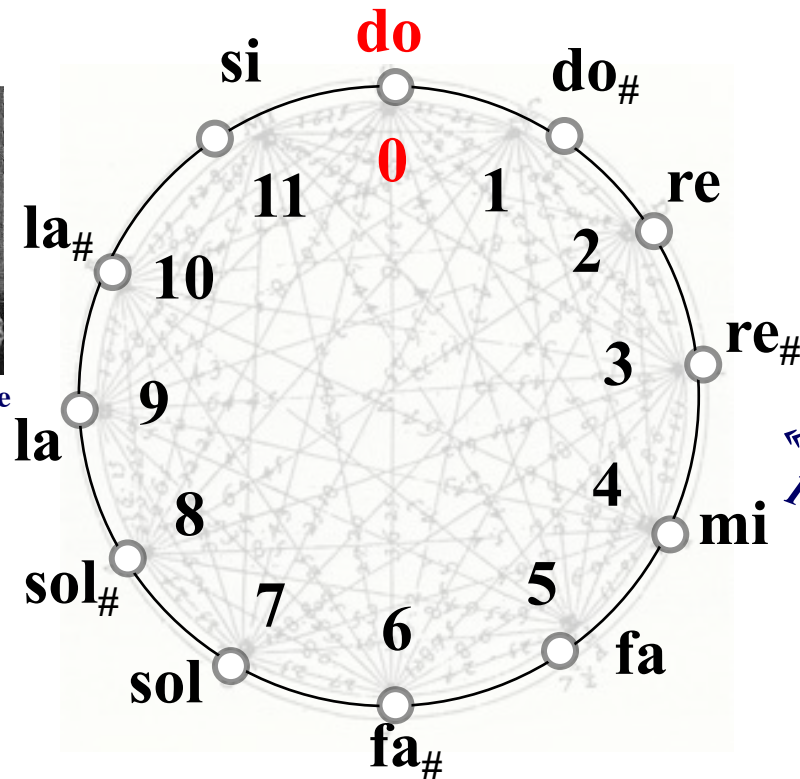
Marin Mersenne



La représentation circulaire de l'espace des hauteurs



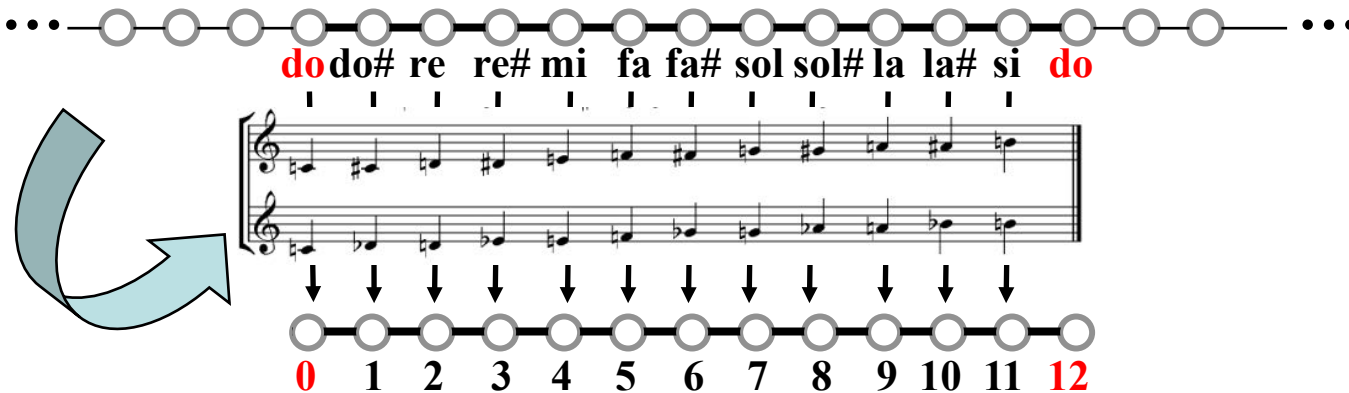
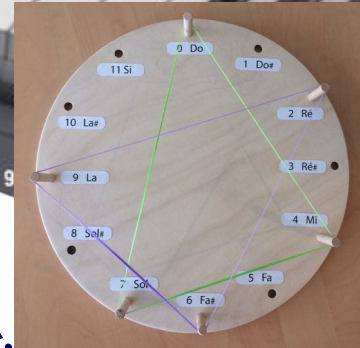
Marin Mersenne



Harmonicorum Libri XII, 1648

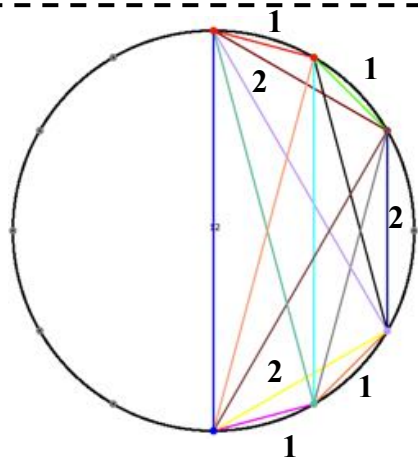
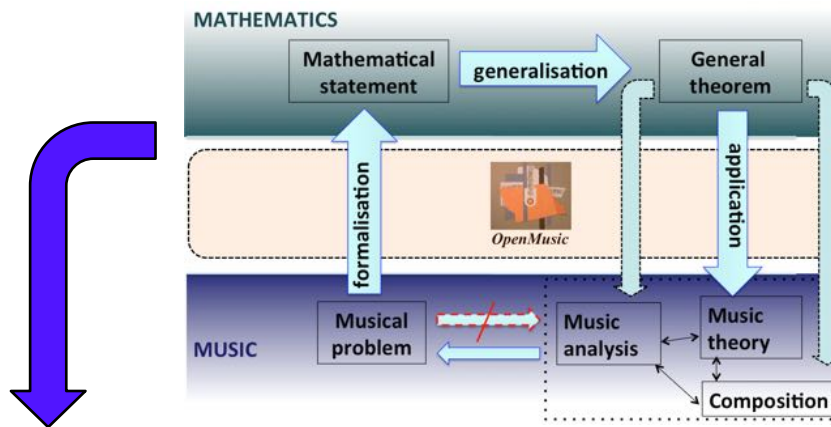


M. Andreatta, C. Agon,
« La musique mise en algèbre »,
Pour la Science, 2008



➔ DEMO

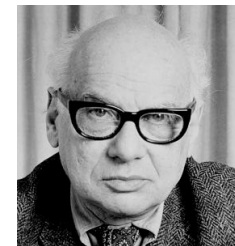
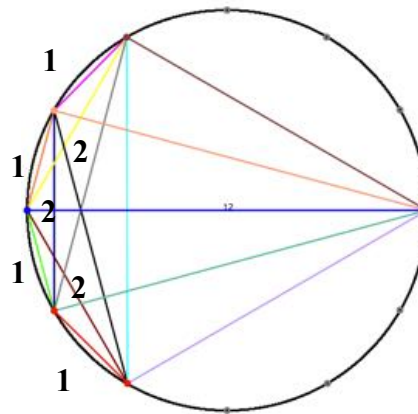
Un petit théorème d'algèbre combinatoire



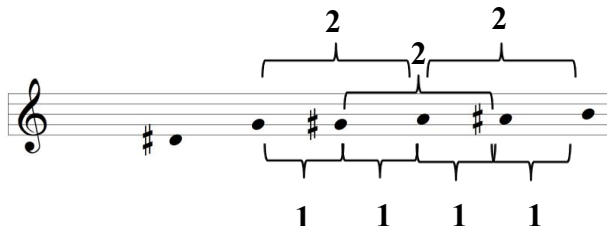
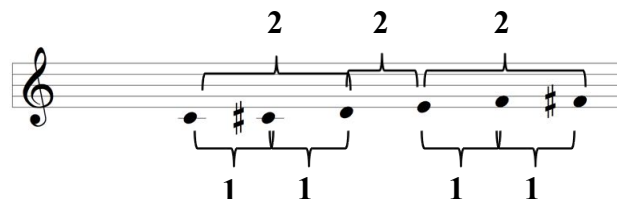
HOMOMETRIE

$\approx$

Théorème de l'hexacorde



M. Babbitt



La réduction à l'octave et le cadran d'horloge



7

... ...

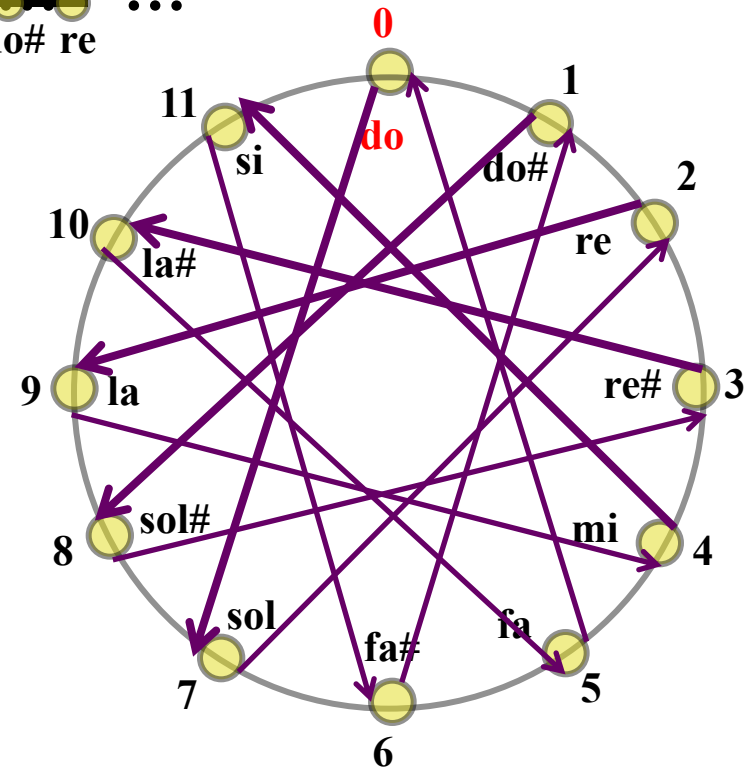
do do# re re# mi fa fa# sol sol# la la# si do do# re



...

0 1 2 3 4 5 6 7 8 9 10 11 12

Cycle des quintes



La réduction à l'octave et le cadran d'horloge



5

... ...

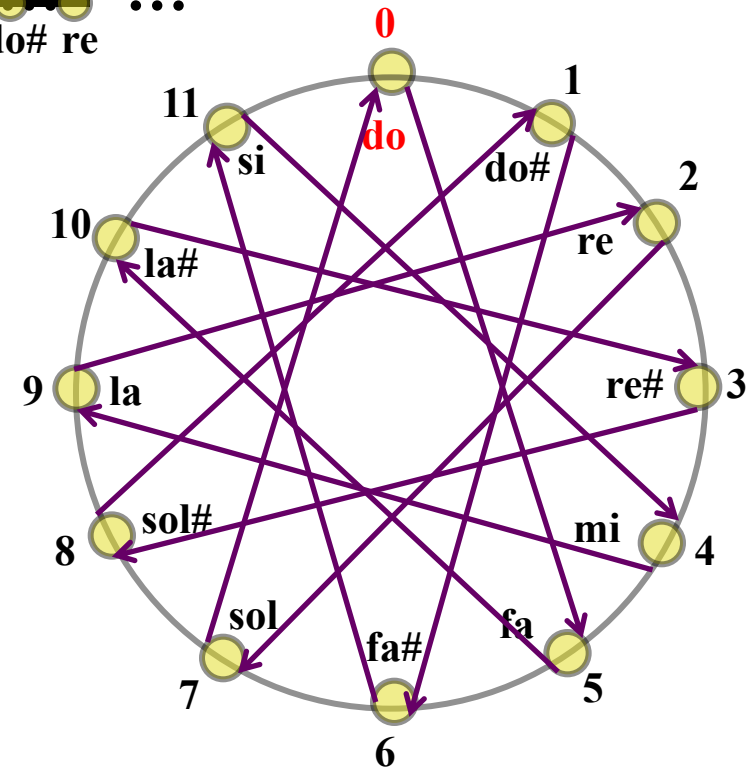
do do# re re# mi fa fa# sol sol# la la# si do do# re



...

0 1 2 3 4 5 6 7 8 9 10 11 12

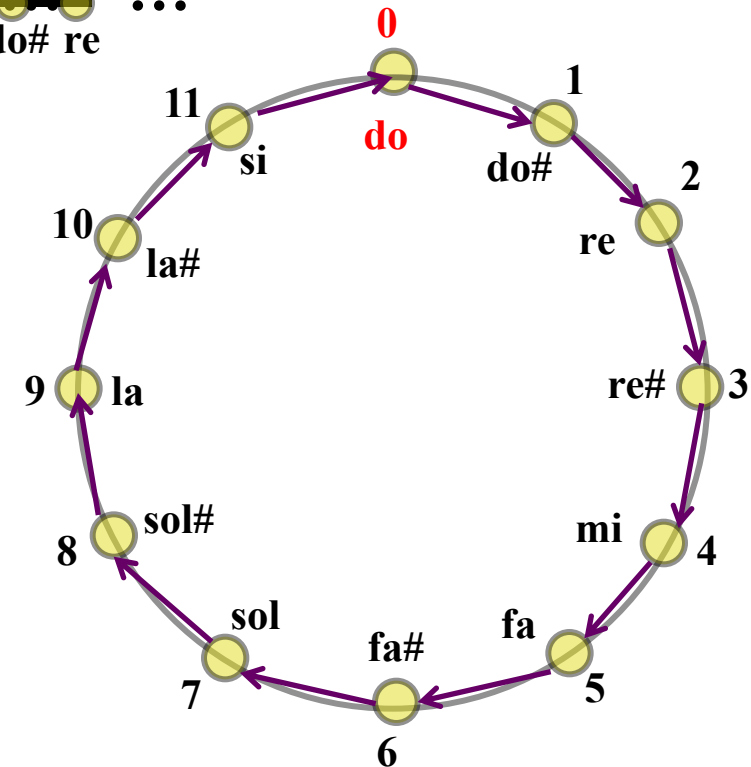
Cycle des quartes



La réduction à l'octave et le cadran d'horloge



1



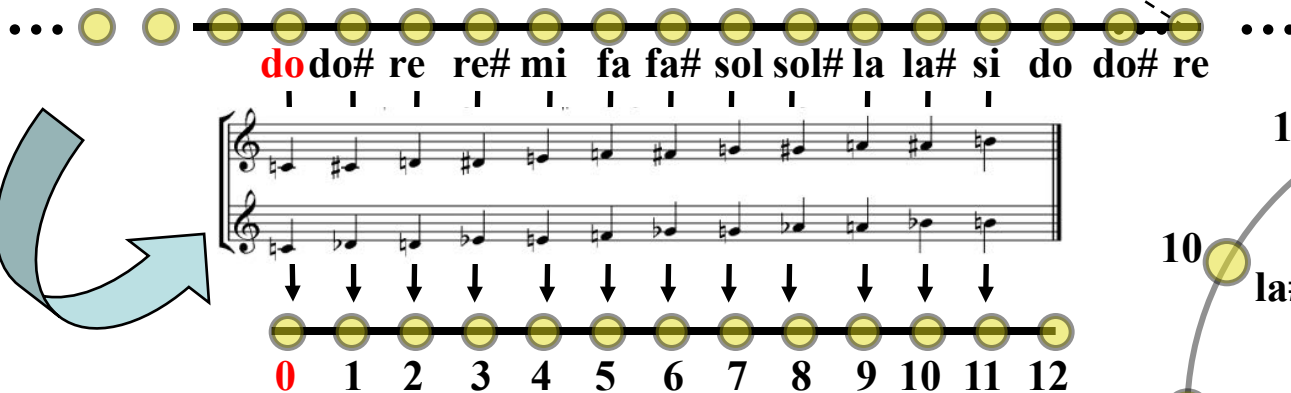
➔ Quels sont les autres entiers qui engendrent le cercle ?

La réduction à l'octave et le cadran d'horloge

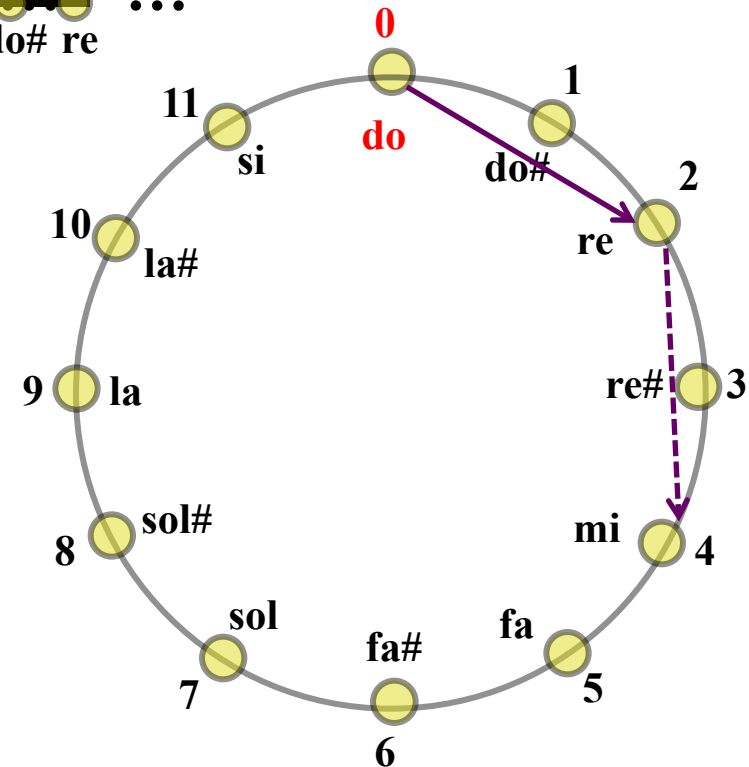


?

2



➔ Quels sont les autres entiers qui engendrent le cercle ?



La réduction à l'octave et le cadran d'horloge



?

2

... ...

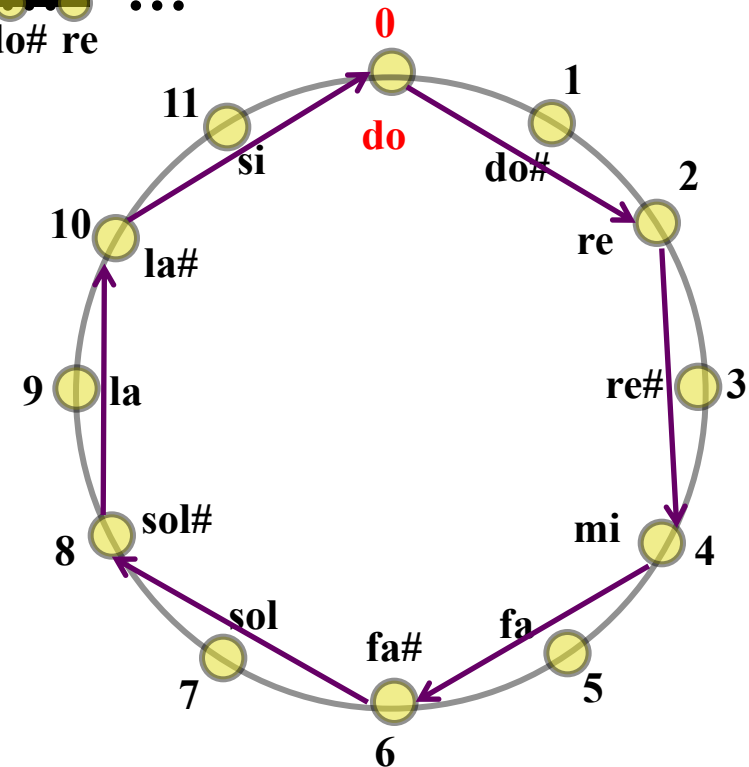
do do# re re# mi fa fa# sol sol# la la# si do do# re



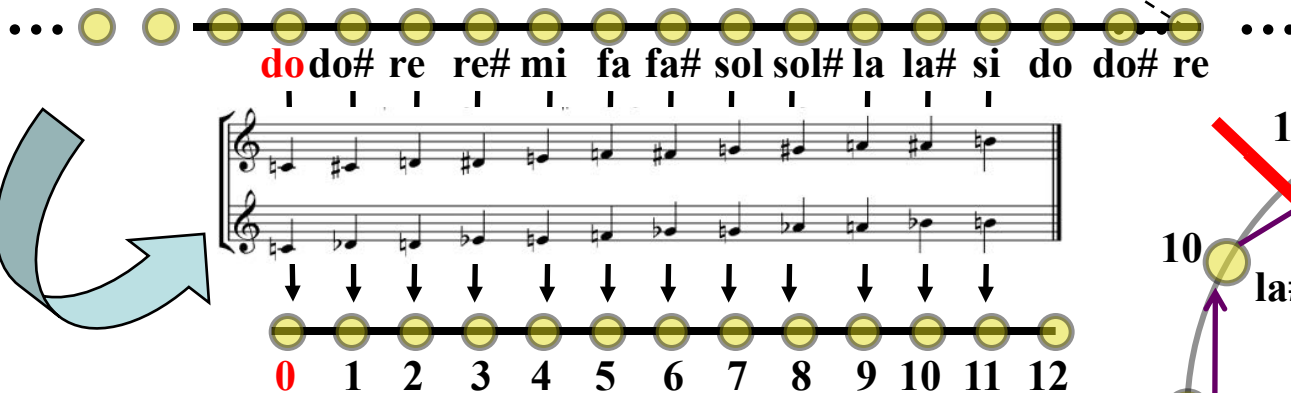
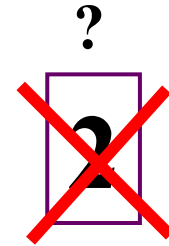
...

0 1 2 3 4 5 6 7 8 9 10 11 12

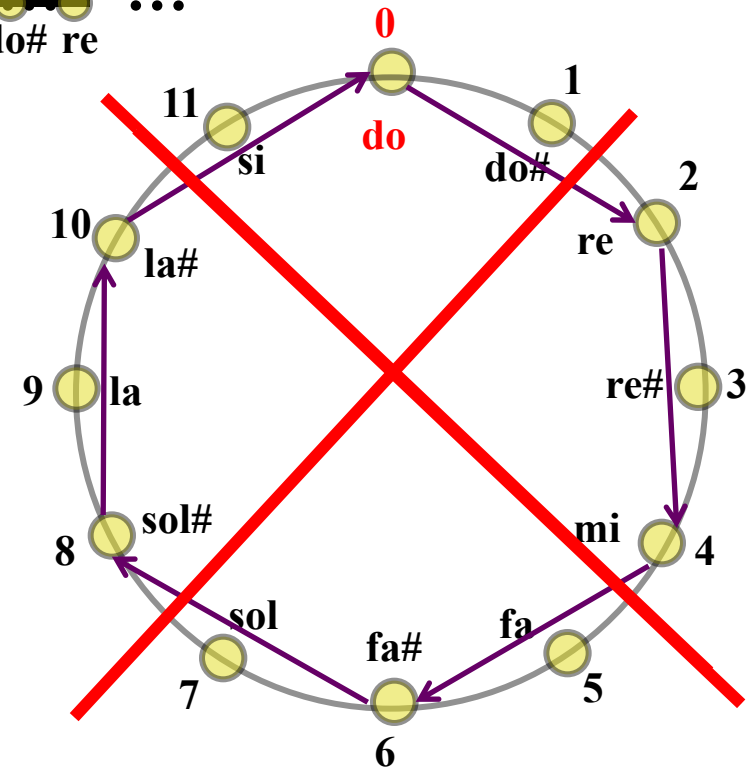
➔ Quels sont les autres entiers qui engendrent le cercle ?



La réduction à l'octave et le cadran d'horloge



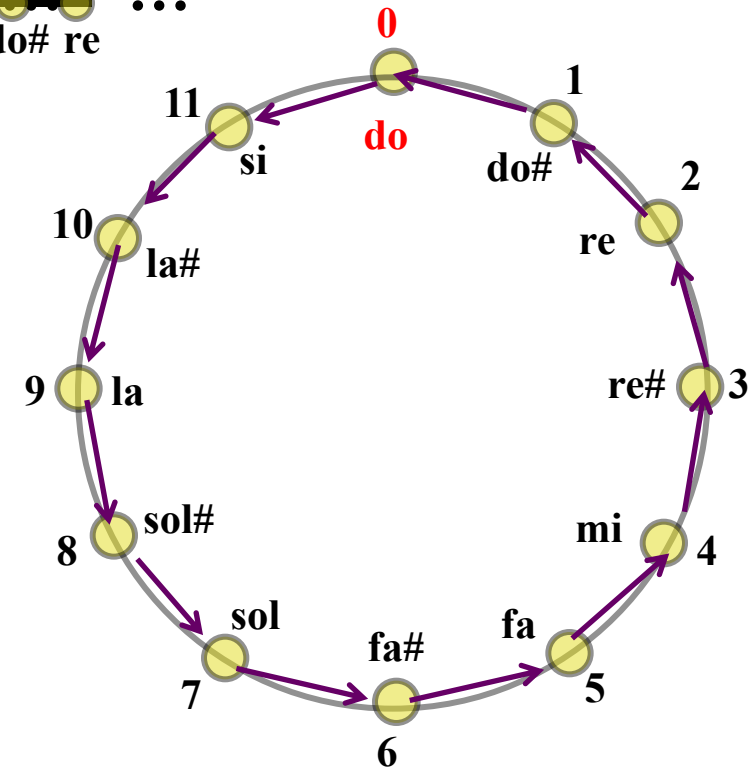
➔ Quels sont les autres entiers qui engendrent le cercle ?



La réduction à l'octave et le cadran d'horloge



11

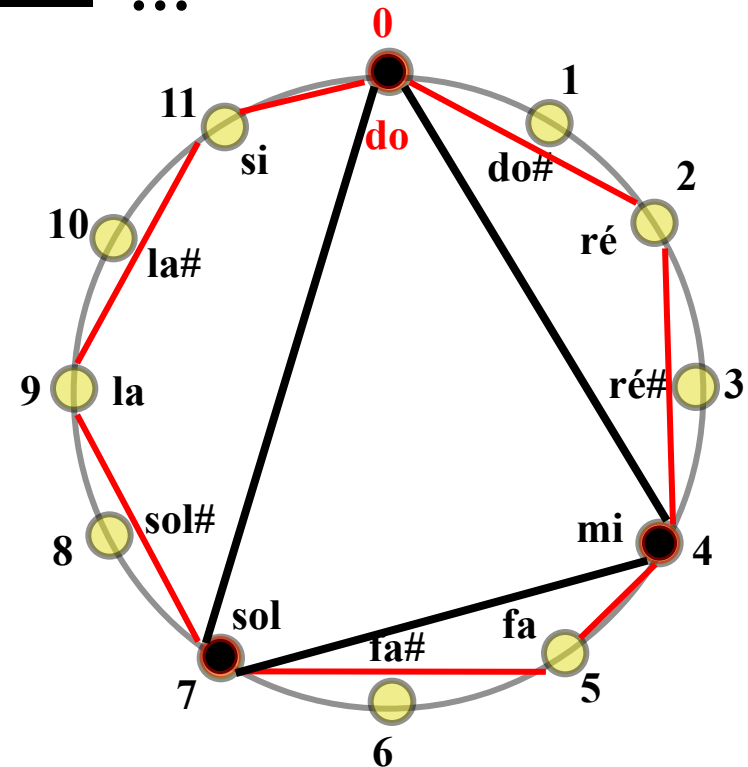
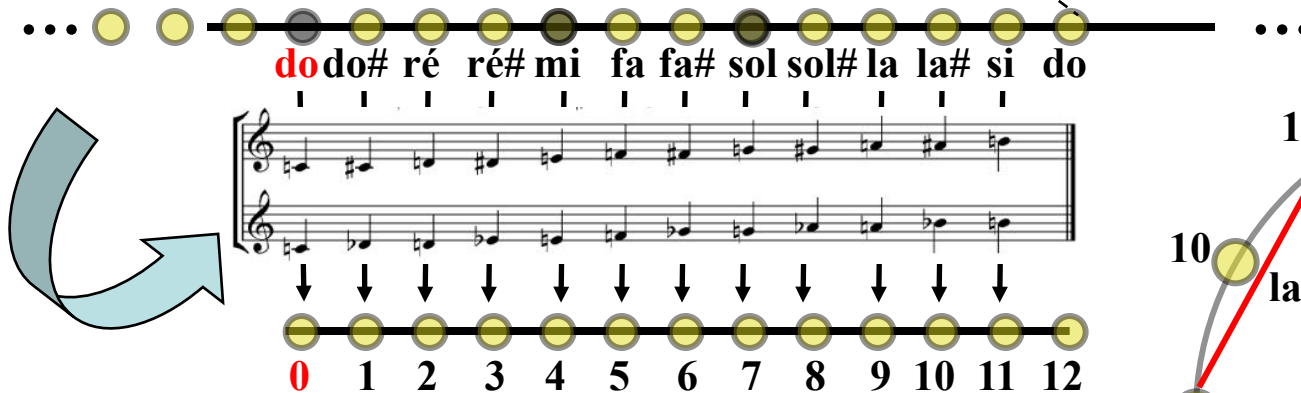


➔ Quels sont les autres entiers qui engendrent le cercle ?

Les transpositions sont des additions...



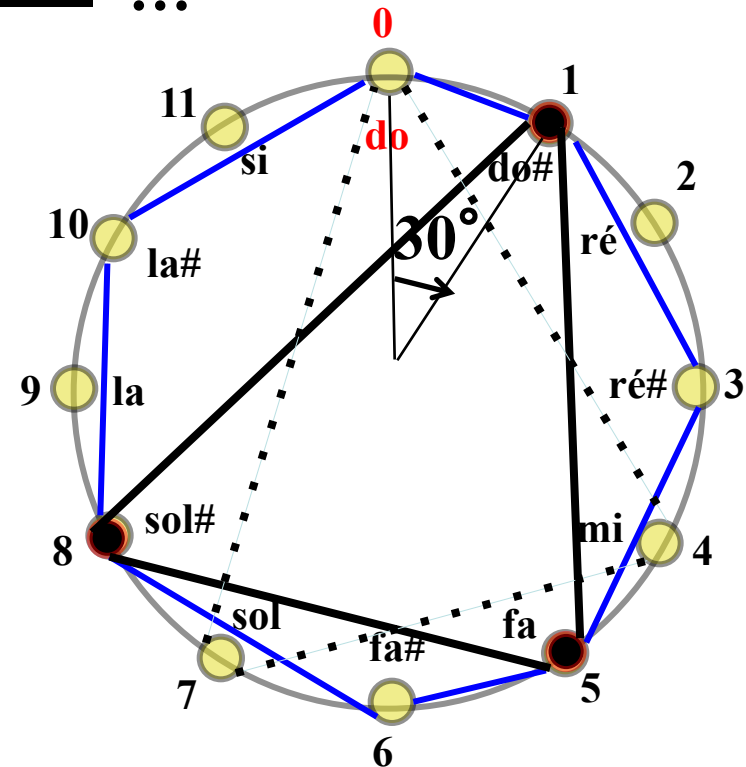
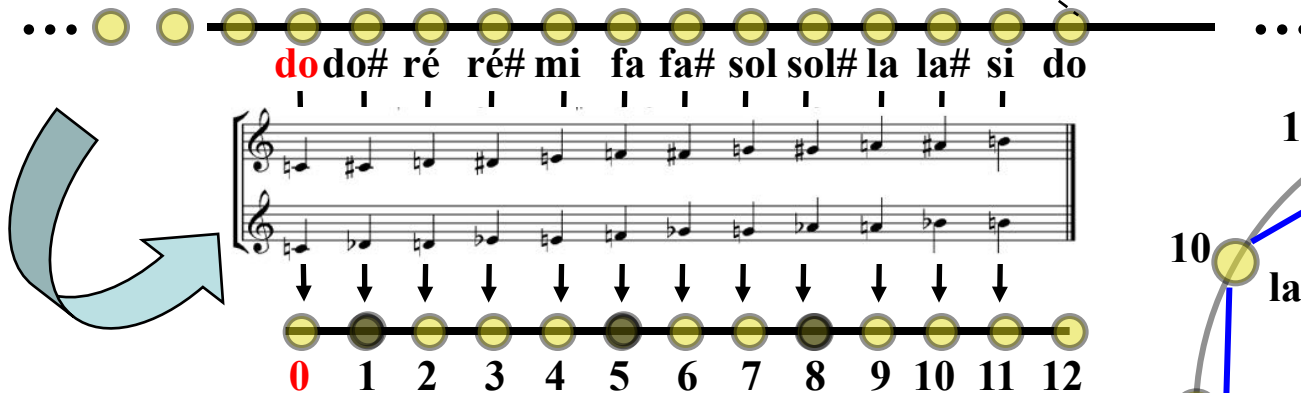
$$\text{Do maj} = \{0, 2, 4, 5, 7, 9, 11\} + 1$$



Les transpositions sont des additions...



$$Do\# \text{ maj} = \{1, 3, 5, 6, 8, 10, 0\}$$



... ou des rotations !

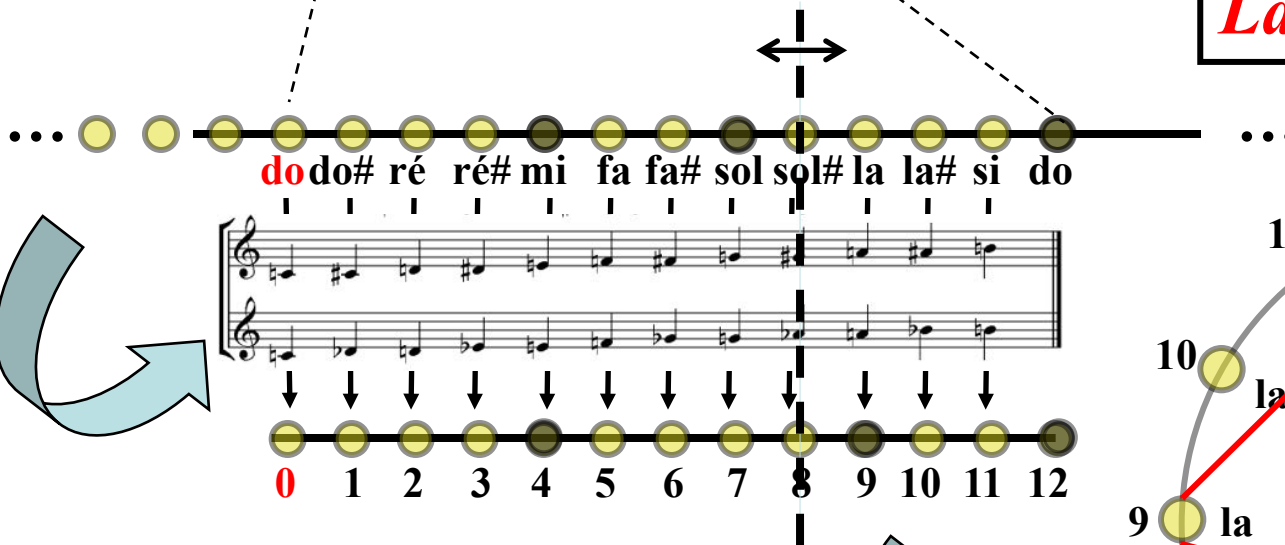
Les inversions sont des symétries axiales



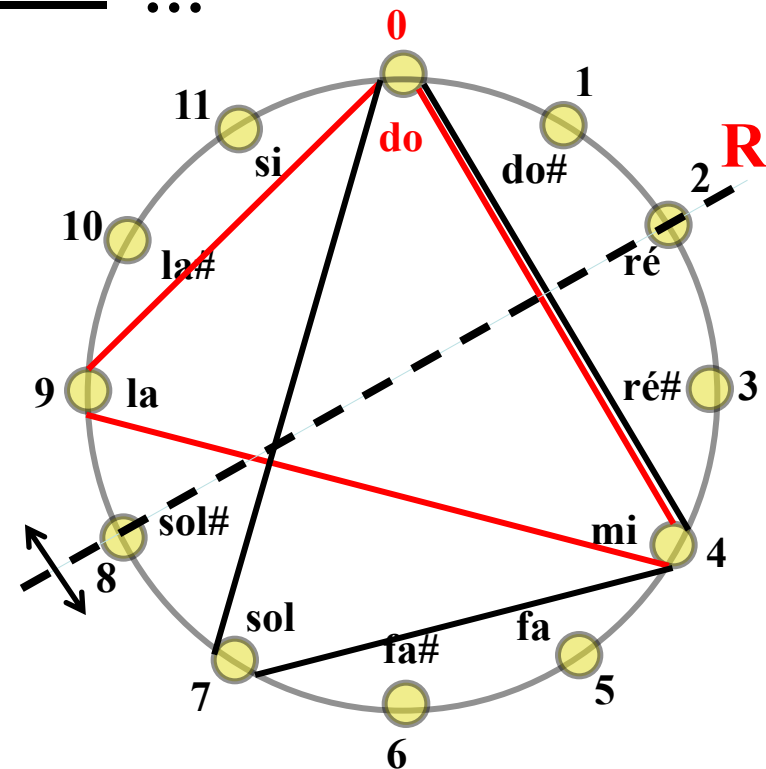
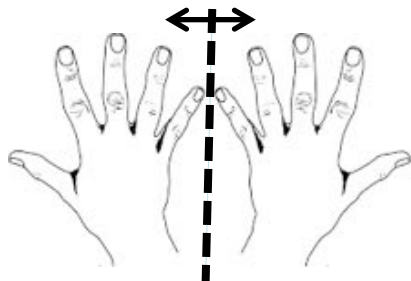
R comme **relatif**

Do maj = {0,4,7}

La min = {0,4,9}



0 1 2 3 4 5 6 7 8 9 10 11 12



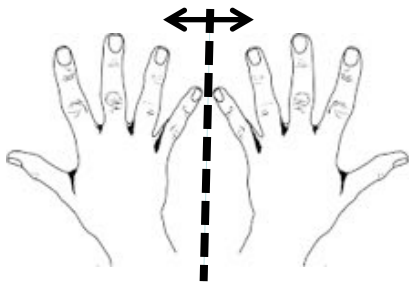
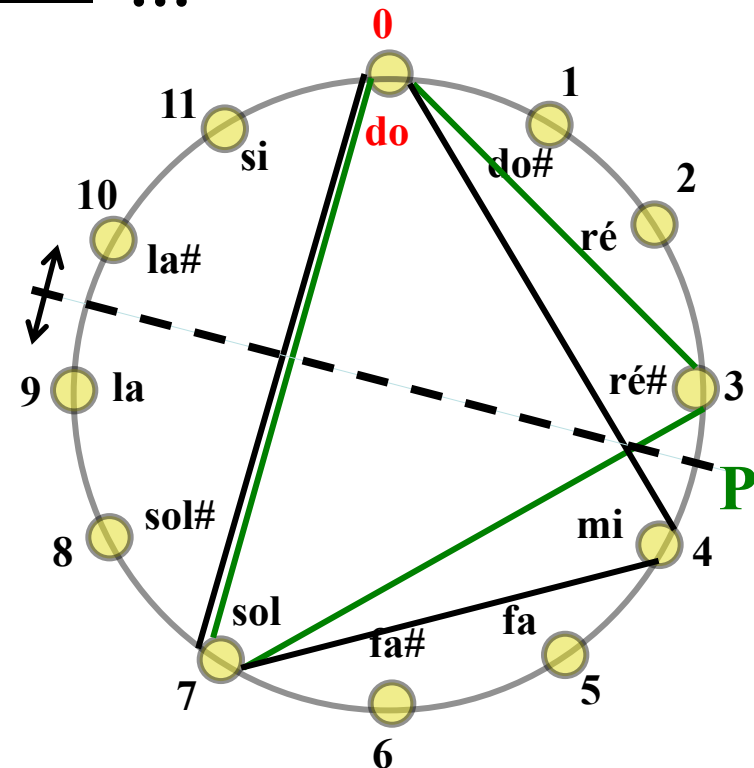
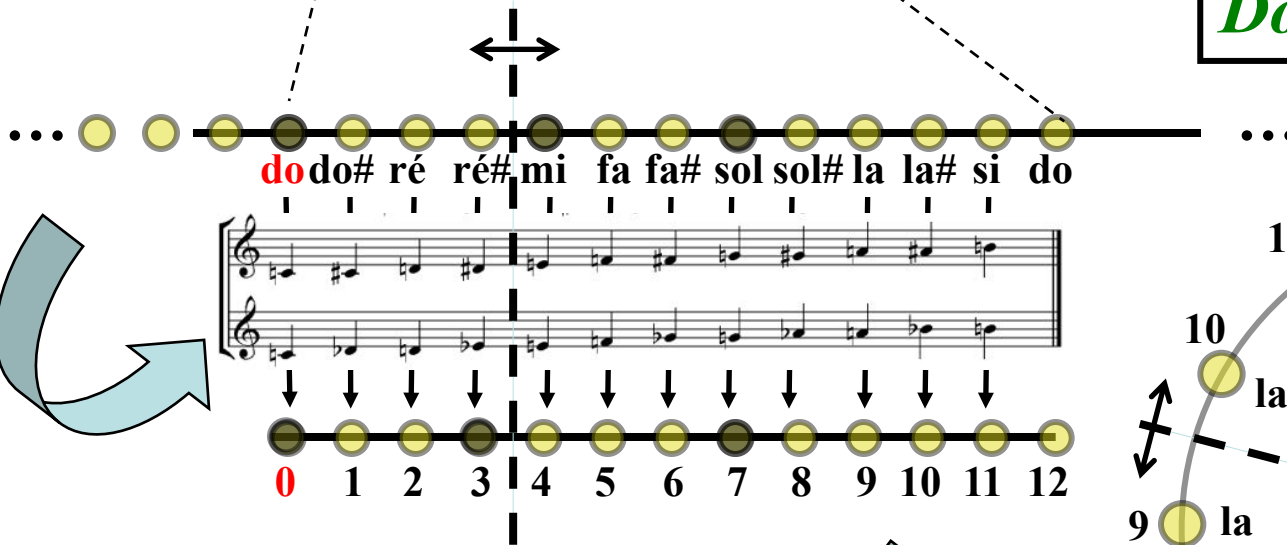
Les inversions sont des symétries axiales



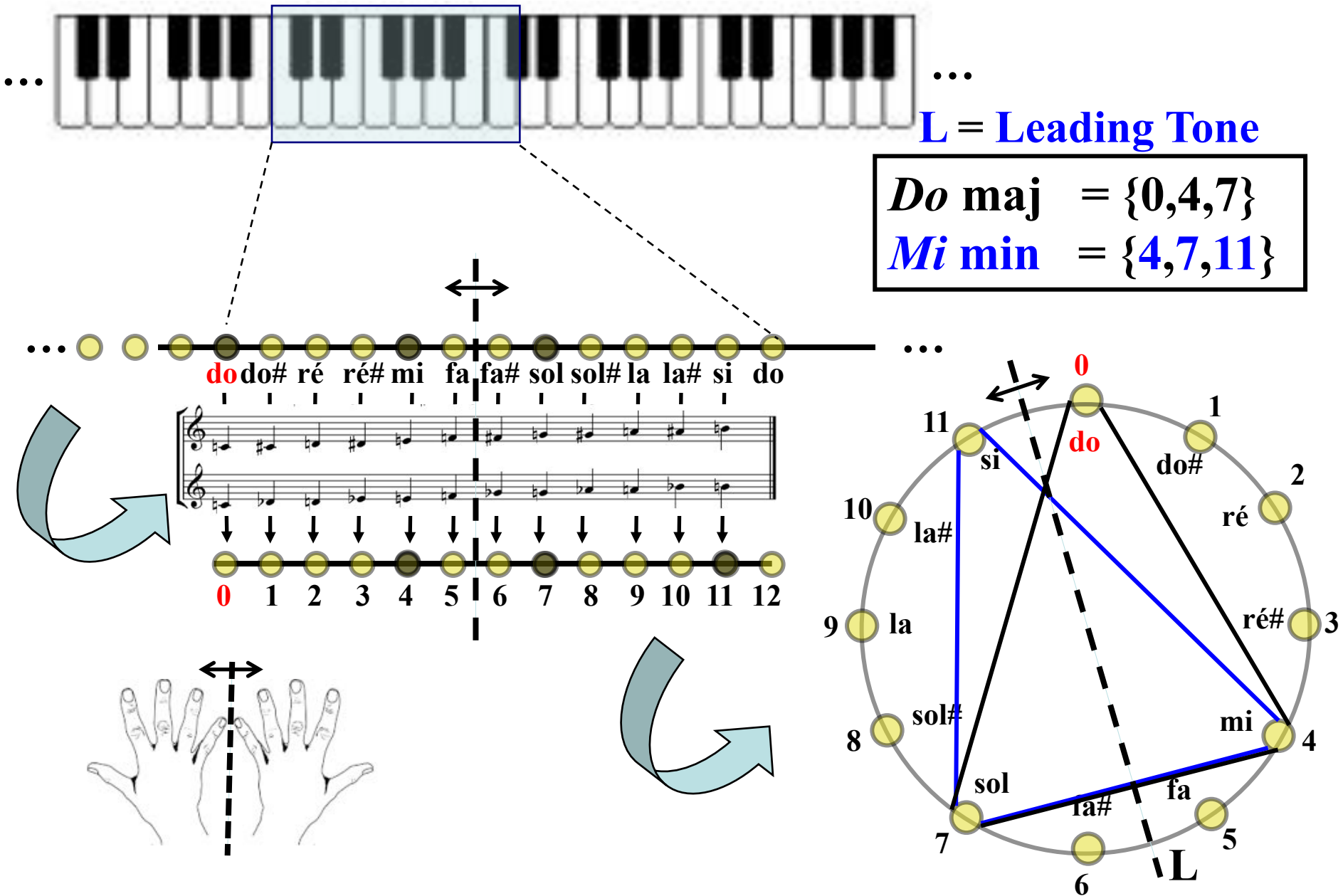
P comme **parallèle**

Do maj = {0,4,7}

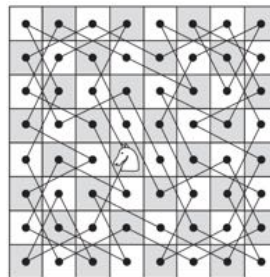
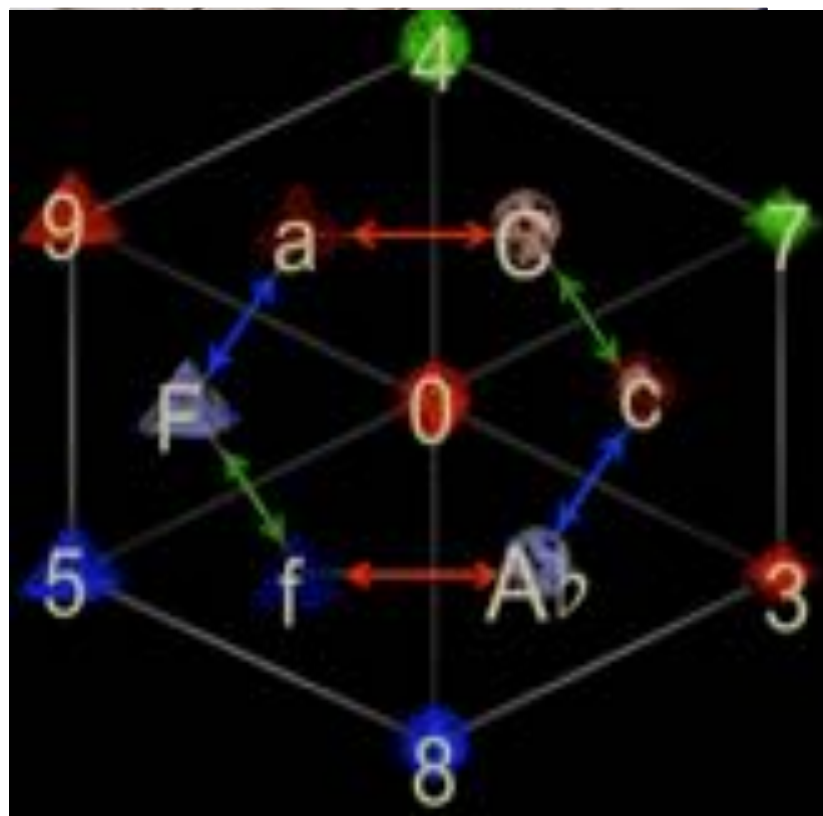
Do min = {0,3,7}



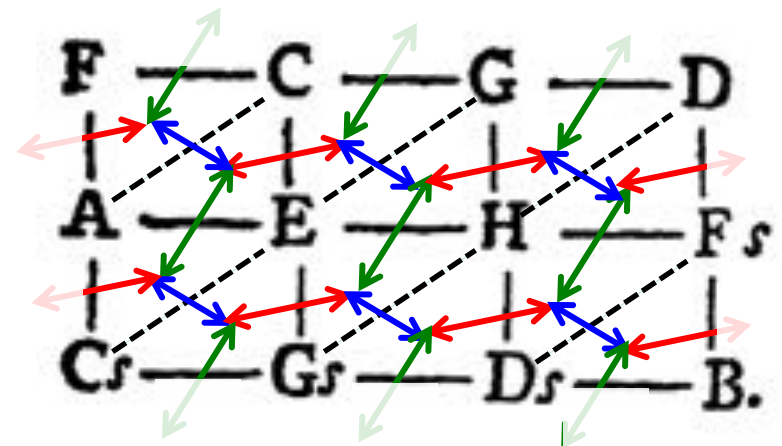
Les inversions sont des symétries axiales



Le Tonnetz (ou nid musical d'abeilles)



Leonhard Euler



Speculum Musicum (1773)

➔ DEMO



Two Dimensions

Traditional Chordal Space

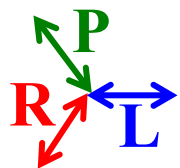
© Gilles Baroin 2011



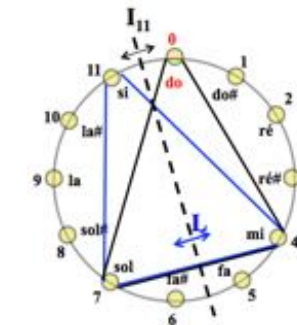
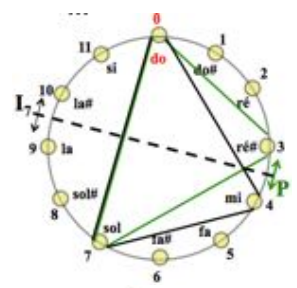
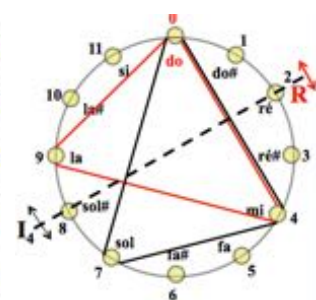
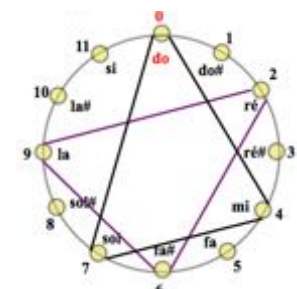
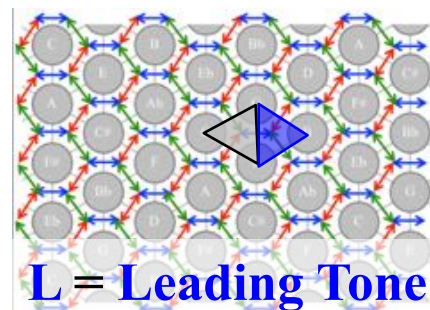
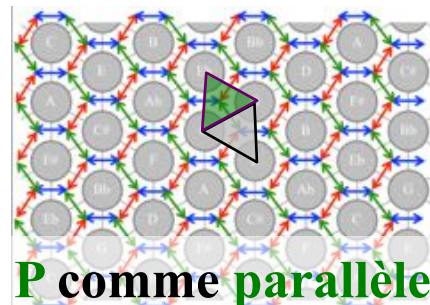
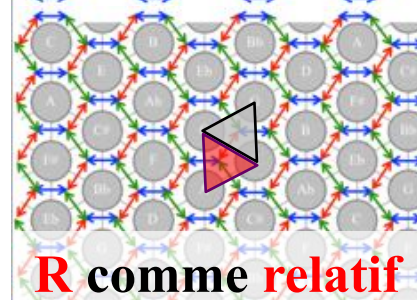
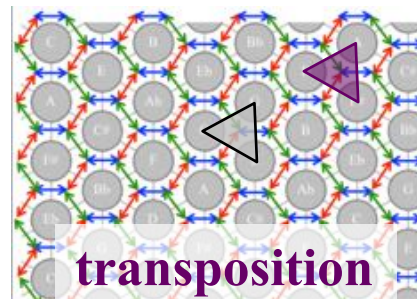
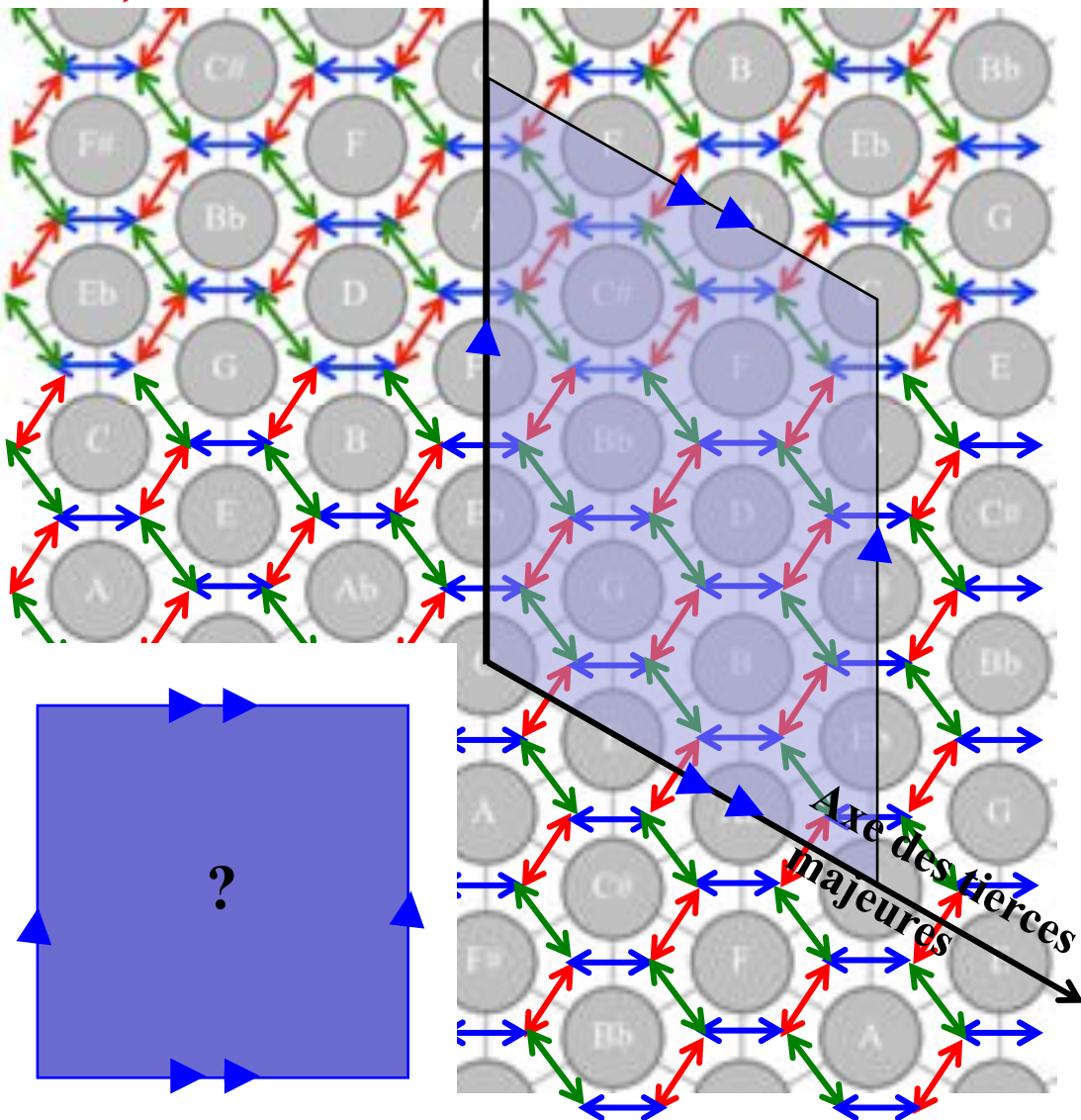
Gilles Baroin

➔ <http://www.mathemusic4d.net/>

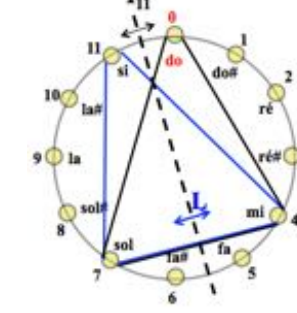
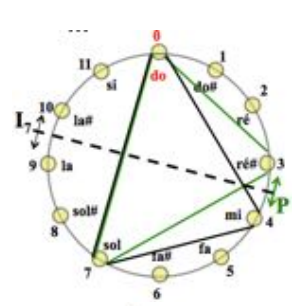
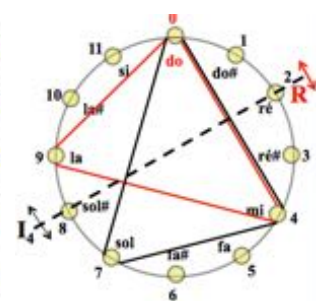
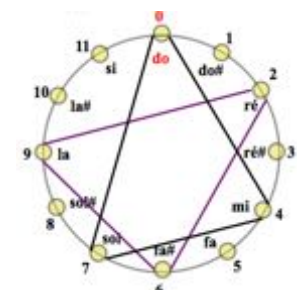
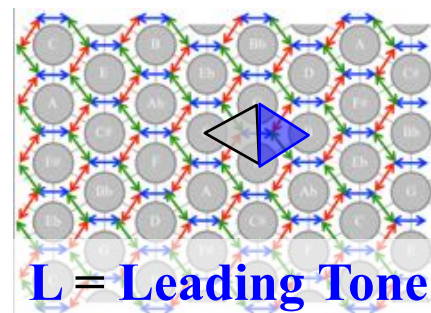
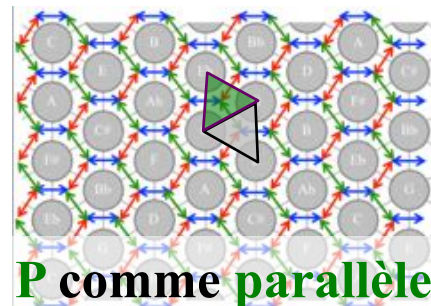
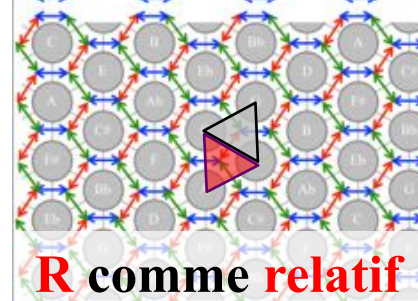
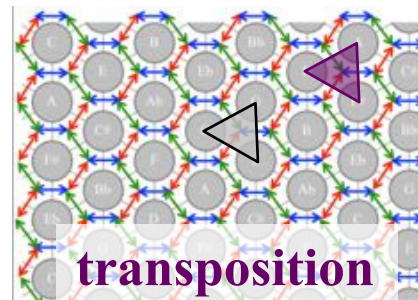
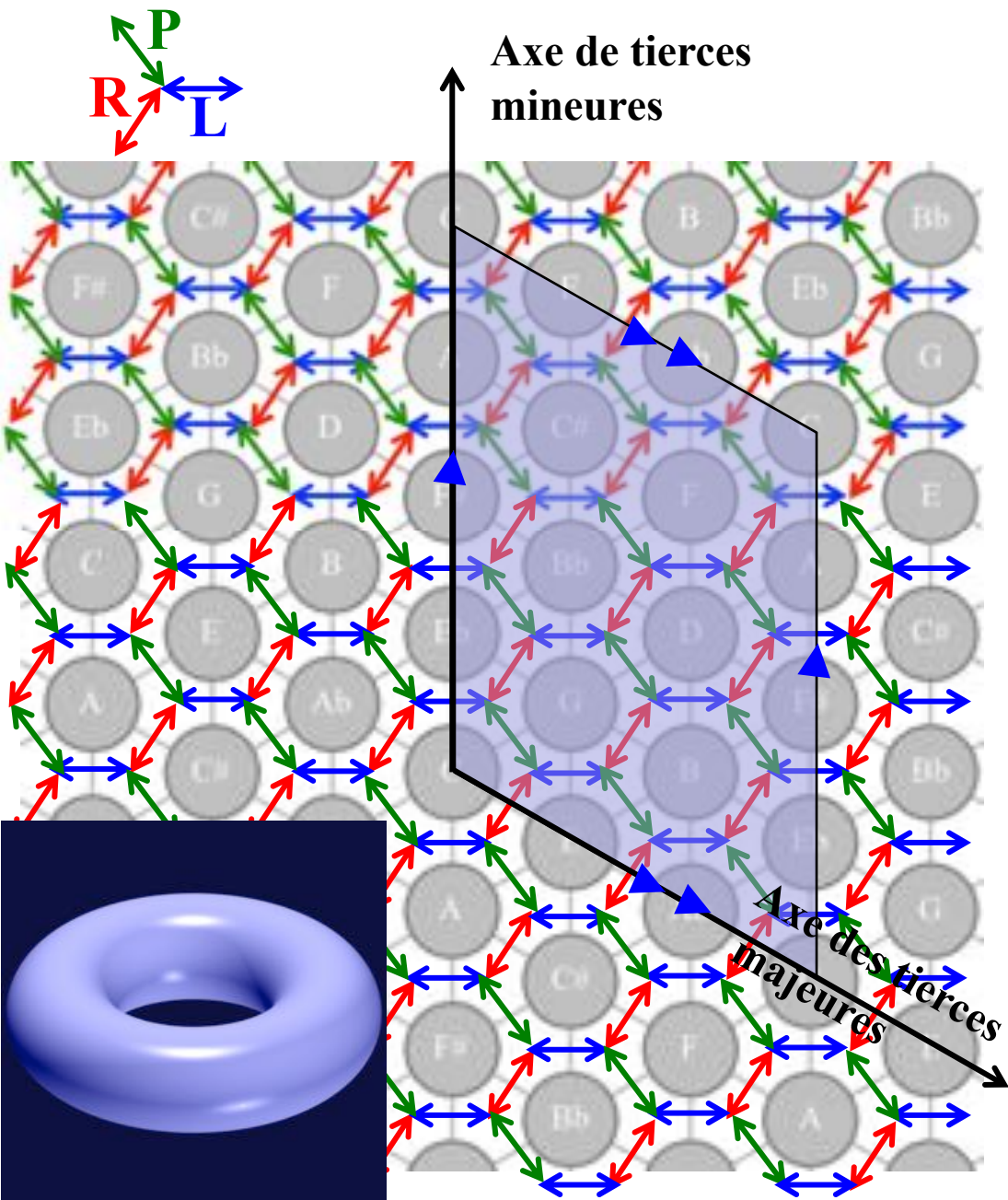
Le Tonnetz et ses symétries

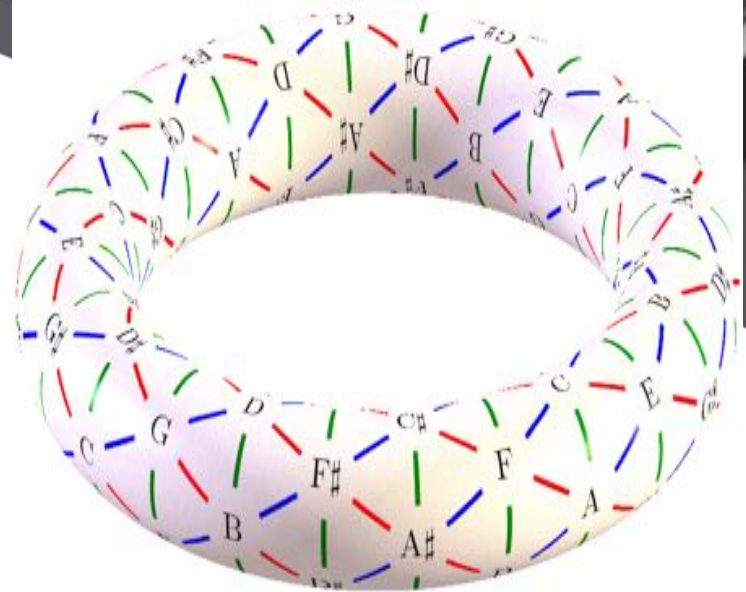
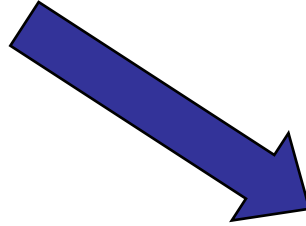
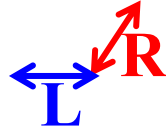
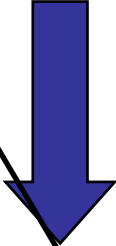


Axe de tierces mineures

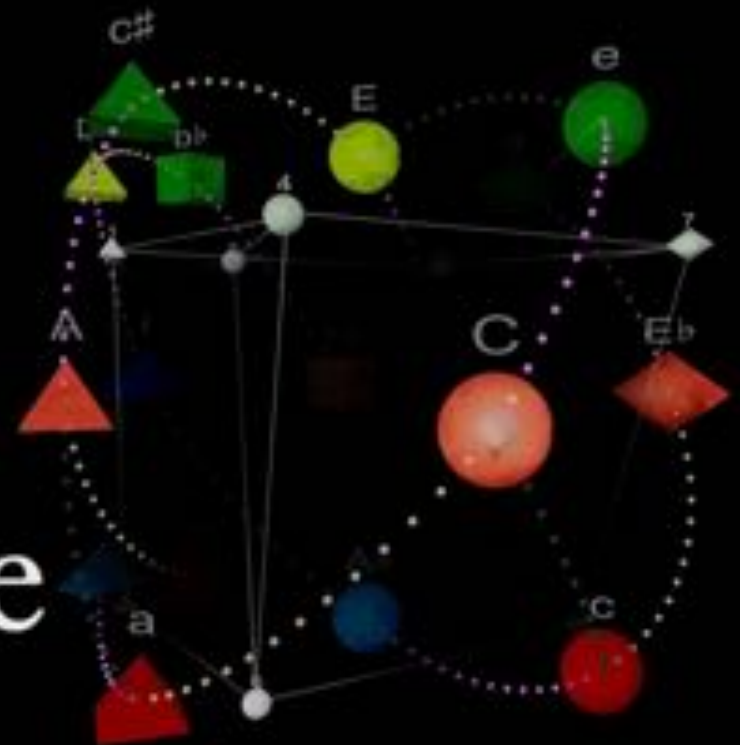


Le Tonnetz et ses symétries





Beethoven and the Hypersphere (and the Tonnetz)

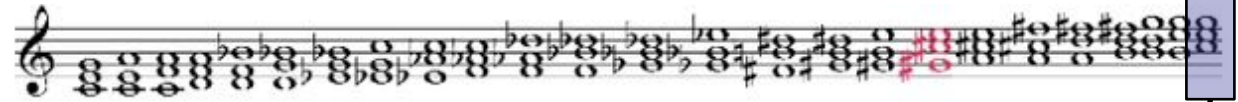


Gilles Baroin 2016
www.MatheMusic.net

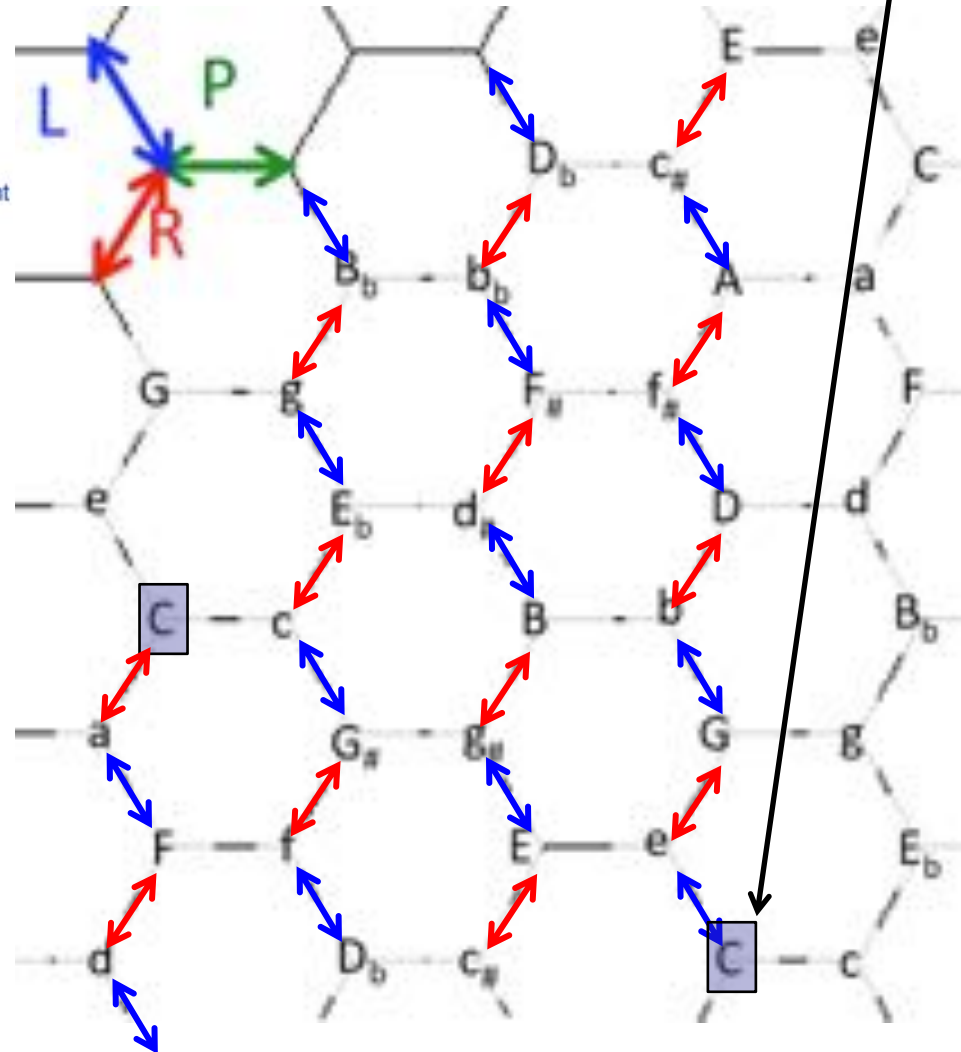
Zig-zag et cycles hamiltoniens dans le Tonnetz

Le Blé en Herbe

(Polo/Moreno/Dieu)



← time



Plonger comme un enfant, cheveux au vent

Croiser matin dans l'herbe folle

Sous l'océan du blé en herbe

Deux tourterelles qui s'envolent

Marée d'épis couleur d'amande

Suivre les jeux des hirondelles

Qui tendent à caresser le ciel

Sur le paysage éternel

Nager comme un enfant, cheveux au vent

Algues tendres de mille plages

Sous l'océan

Frôlant le ventre des nuages

Du blé en herbe

Cheveux de pluie, dos de poissons

Marée de fruits au goût amer

Qui frissonnent à l'unisson

Acide et salée comme la mer

Suivre le bord des continents

Vers l'îlot d'un petit village

Dans l'océan du blé en herbe

Vers un château d'eau sur la plage

Pêcher le corail du pavot

Quand tout s'éteint avant l'orage

Dans le sang des coquelicots

Quand se lève le vent du large

Sur le blé vert

CABARET HAMILTONIEN

FABRICE QUÉDY

Formalises dans la musique savante

MORENO ANDREATTA

Mentoratise appliquée à la musique

POLO PIERRE LAMY

Édition appliquée aux formes musicales

Alexis - Voix, guitare, écriture

Audrey - Voix, claviers, écriture

Clara - Voix, guitare, écriture

Emilie - Voix, harmonica, écriture

Sofie - Voix, flûte, écriture

Thomas - Voix, claviers, écriture

Écrire sous la contrainte...

TACHER DU PAPIER SOUS

L'OBLIGATION DE FAIRE

QUELQUE CHOSE...

SALIR DU BOIS CONDITIONNÉ
AVEC LE DEVOIR MORAL DE
TRANSFORMER UN OBJET
INDEFINI...

SAMEDI 27 FÉVRIER 2016 À 11H

AMPHI PARIS SCIENCE ET LETTRES

22 rue du Soufflot

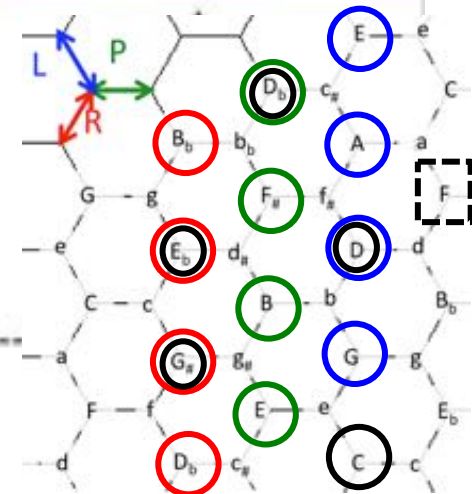
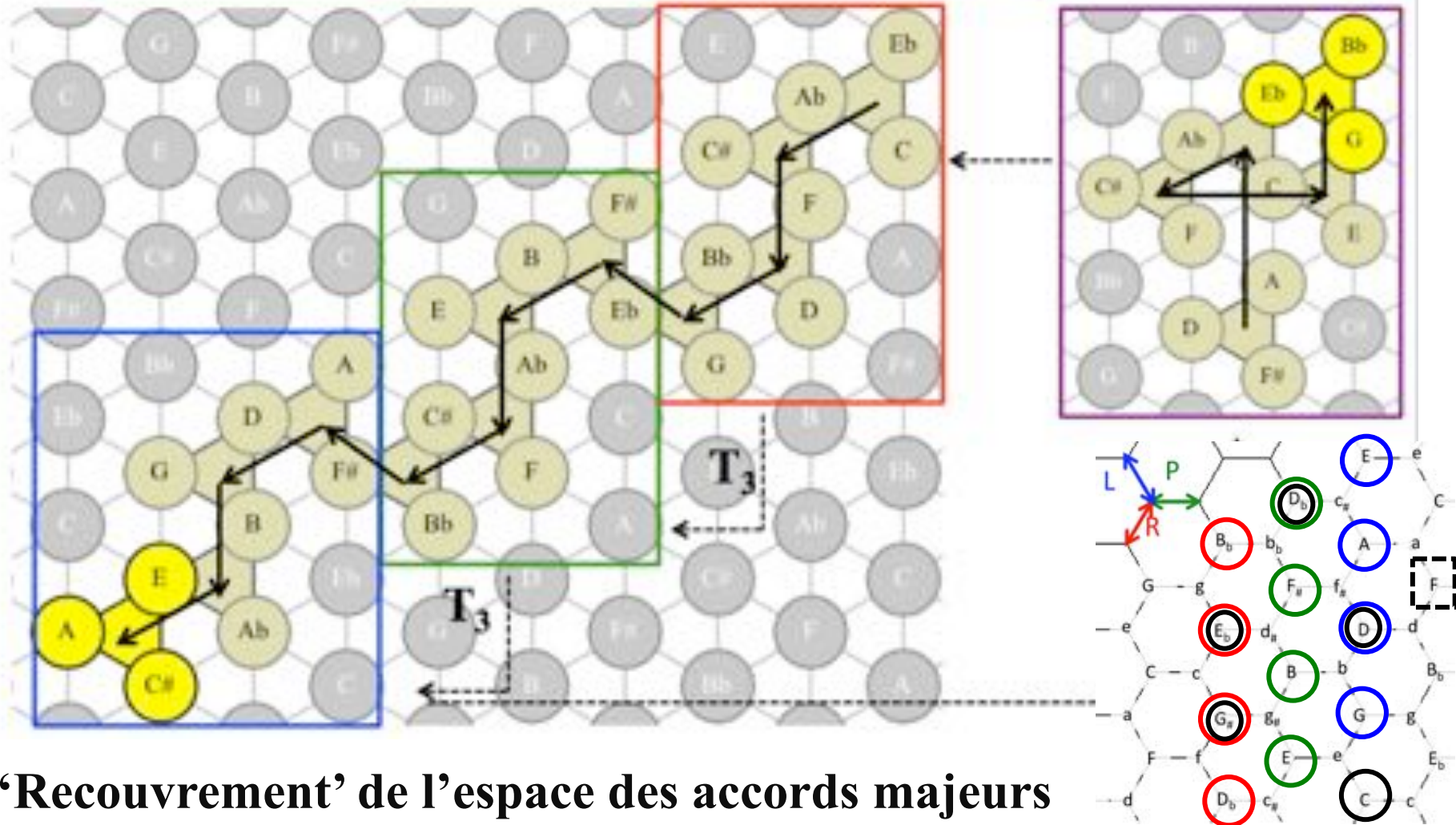
75005 Paris

ENTRÉE LIBRE



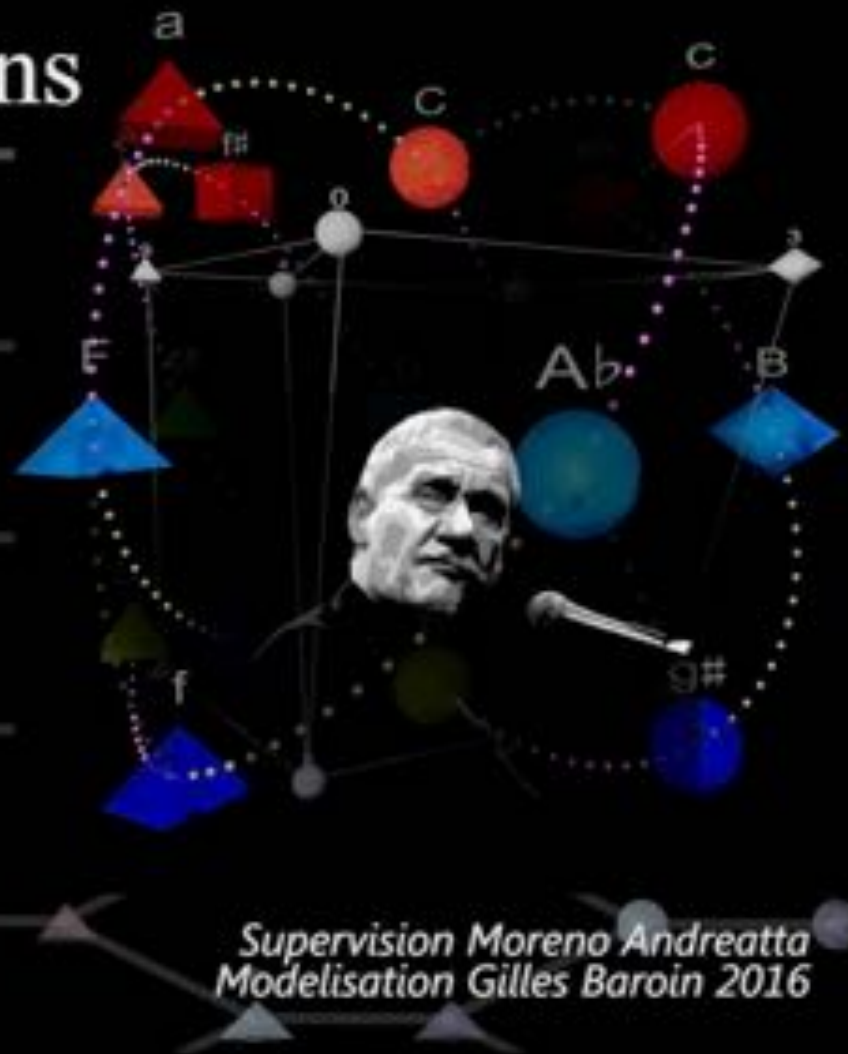
Symétries dans *Madeleine* de Paolo Conte

La_b Re_b Si_b Mi_b Si Mi Re_b Fa_♯ Re Sol Mi La Re La_b Re_b Do Mi_b



‘Recouvrement’ de l’espace des accords majeurs

Harmonic Progression
In Paolo Conte
Madeleine



La collection des 28 cycles hamiltoniens « redondants »

1. C-Cm-Ab-Abm-E-C#m-A-Am-F-Fm-C#-Bbm-F#-F#m-D-Dm-Bb-Gm-Eb-Ebm-B-Bm-G-Em--PLPLRL
2. C-Cm-Ab-Fm-C#-C#m-A-Am-F-Dm-Bb-Bbm-F#-F#m-D-Bm-G-Gm-Eb-Ebm-B-Abm-E-Em--PLRLPL
3. C-Cm-Eb-Ebm-F#-F#m-A-C#m-E-Em-G-Gm-Bb-Bbm-C#-Fm-Ab-Abm-B-Bm-D-Dm-F-Am--PRPRPRLR
4. C-Cm-Eb-Ebm-F#-Bbm-C#-C#m-E-Em-G-Gm-Bb-Dm-F-Fm-Ab-Abm-B-Bm-D-F#m-A-Am--PRPRLRPR
5. C-Cm-Eb-Ebm-F#-Bbm-C#-Fm-Ab-Abm-B-Bm-D-F#m-A-C#m-E-Em-G-Gm-Bb-Dm-F-Am--PRPRLRLR
6. C-Cm-Eb-Gm-Bb-Bbm-C#-C#m-E-Em-G-Bm-D-Dm-F-Fm-Ab-Abm-B-Ebm-F#-F#m-A-Am--PRLRPRPR
7. C-Cm-Eb-Gm-Bb-Bbm-C#-Fm-Ab-Abm-B-Ebm-F#-F#m-A-C#m-E-Em-G-Bm-D-Dm-F-Am--PRLR
8. C-Cm-Eb-Gm-Bb-Dm-F-Fm-Ab-Abm-B-Ebm-F#-Bbm-C#-C#m-E-Em-G-Bm-D-F#m-A-Am--PRLRLRPR
9. C-Em-E-Abm-Ab-Cm-Eb-Gm-G-Bm-B-Ebm-F#-Bbm-Bb-Dm-D-F#m-A-C#m-C#-Fm-F-Am--LPLPLR
10. C-Em-E-Abm-B-Ebm-Eb-Gm-G-Bm-D-F#m-F#-Bbm-Bb-Dm-F-Am-A-C#m-C#-Fm-Ab-Cm--LPLRLP
11. C-Em-G-Gm-Bb-Bbm-C#-C#m-E-Abm-B-Bm-D-Dm-F-Fm-Ab-Cm-Eb-Ebm-F#-F#m-A-Am--LRPRPRPR
12. C-Em-G-Gm-Bb-Bbm-C#-Fm-Ab-Cm-Eb-Ebm-F#-F#m-A-C#m-E-Abm-B-Bm-D-Dm-F-Am--LRPRPRLR
13. C-Em-G-Gm-Bb-Dm-F-Fm-Ab-Cm-Eb-Ebm-F#-Bbm-C#-C#m-E-Abm-B-Bm-D-F#m-A-Am--LRPR
14. C-Em-G-Bm-B-Ebm-Eb-Gm-Bb-Dm-D-F#m-F#-Bbm-C#-Fm-F-Am-A-C#m-E-Abm-Ab-Cm--LRLPLP
15. C-Em-G-Bm-D-Dm-F-Fm-Ab-Cm-Eb-Gm-Bb-Bbm-C#-C#m-E-Abm-B-Ebm-F#-F#m-A-Am--LRLRPRPR
16. C-Em-G-Bm-D-F#m-A-C#m-E-Abm-B-Ebm-F#-Bbm-C#-Fm-Ab-Cm-Eb-Gm-Bb-Dm-F-Am--LR
17. C-Am-A-F#m-F#-Ebm-Eb-Cm-Ab-Fm-F-Dm-D-Bm-B-Abm-E-C#m-C#-Bbm-Bb-Gm-G-Em--RPRPRPRL
18. C-Am-A-F#m-F#-Ebm-B-Abm-Ab-Fm-F-Dm-D-Bm-G-Em-E-C#m-C#-Bbm-Bb-Gm-Eb-Cm--RPRPRLRP
19. C-Am-A-F#m-F#-Ebm-B-Abm-E-C#m-C#-Bbm-Bb-Gm-Eb-Cm-Ab-Fm-F-Dm-D-Bm-G-Em--RPRPRLRL
20. C-Am-A-F#m-D-Bm-B-Abm-Ab-Fm-F-Dm-Bb-Gm-G-Em-E-C#m-C#-Bbm-F#-Ebm-Eb-Cm--RPRLRPRP
21. C-Am-A-F#m-D-Bm-B-Abm-E-C#m-C#-Bbm-F#-Ebm-Eb-Cm-Ab-Fm-F-Dm-Bb-Gm-G-Em--RPRL
22. C-Am-A-F#m-D-Bm-G-Em-E-C#m-C#-Bbm-F#-Ebm-B-Abm-Ab-Fm-F-Dm-Bb-Gm-Eb-Cm--RPRLRLRP
23. C-Am-F-Fm-C#-C#m-A-F#m-D-Dm-Bb-Bbm-F#-Ebm-B-Bm-G-Gm-Eb-Cm-Ab-Abm-E-Em--RLPLPL
24. C-Am-F-Dm-D-Bm-B-Abm-Ab-Fm-C#-Bbm-Bb-Gm-G-Em-E-C#m-A-F#m-F#-Ebm-Eb-Cm--RLRPRPRP
25. C-Am-F-Dm-D-Bm-B-Abm-E-C#m-A-F#m-F#-Ebm-Eb-Cm-Ab-Fm-C#-Bbm-Bb-Gm-G-Em--RLRPRPRL
26. C-Am-F-Dm-D-Bm-G-Em-E-C#m-A-F#m-F#-Ebm-B-Abm-Ab-Fm-C#-Bbm-Bb-Gm-Eb-Cm--RLRP
27. C-Am-F-Dm-Bb-Gm-G-Em-E-C#m-A-F#m-D-Bm-B-Abm-Ab-Fm-C#-Bbm-F#-Ebm-Eb-Cm--RLRLRPRP
28. C-Am-F-Dm-Bb-Gm-Eb-Cm-Ab-Fm-C#-Bbm-F#-Ebm-B-Abm-E-C#m-A-F#m-D-Bm-G-Em--RL



Le Blé en Herbe



➔ Liste complète des 124 cycles hamiltoniens en ligne à l'adresse :

http://repmus.ircam.fr/_media/moreno/list_hamiltonian_cycles_bigo_andreatta_2016.pdf

Cycles hamiltoniens avec périodicité interne

8. C-Cm-Eb-Gm-Bb-Dm-F-Fm-Ab-Abm-B-Ebm-F#-Bbm-C#-C#m-E-Em-G-Bm-D-F#m-A-Am--PRLRLRPR
9. C-Em-E-Abm-Ab-Cm-Eb-Gm-G-Bm-B-Ebm-F#-Bbm-Bb-Dm-D-F#m-A-C#m-C#-Fm-F-Am--LPLPLR
10. C-Em-E-Abm-B-Ebm-Eb-Gm-G-Bm-D-F#m-F#-Bbm-Bb-Dm-F-Am-A-C#m-C#-Fm-Ab-Cm--LPLRLP
11. C-Em-G-Gm-Bb-Bbm-C#-C#m-E-Abm-B-Bm-D-Dm-F-Fm-Ab-Cm-Eb-Ebm-F#-F#m-A-Am--LRPRPRPR
12. C-Em-G-Gm-Bb-Bbm-C#-Fm-Ab-Cm-Eb-Ebm-F#-F#m-A-C#m-E-Abm-B-Bm-D-Dm-F-Am--LRPRRLR



L P L P L R ...
 P L P L R L ...
 L P L R L P ...
 P L R L P L ...

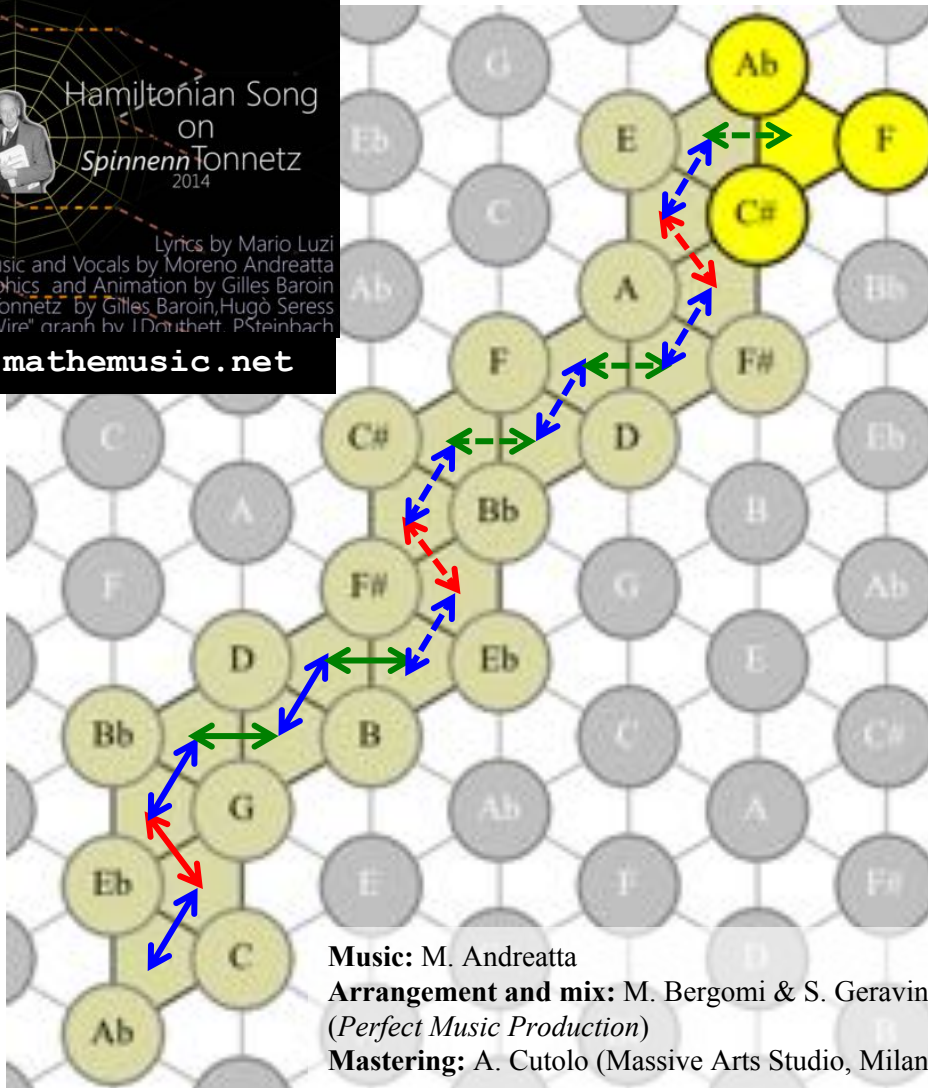


L R L P L P ...

R L P L P L ...



<http://www.mathemusic.net>
 min. 1'02"



Music: M. Andreatta
Arrangement and mix: M. Bergomi & S. Geravini
 (Perfect Music Production)
Mastering: A. Cutolo (Massive Arts Studio, Milan)

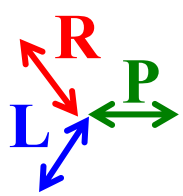
La sera non è più la tua canzone
 (Mario Luzi, 1945, in *Poesie sparse*)

La sera non è più la tua canzone,
 è questa roccia d'ombra traforata
 dai lumi e dalle voci senza fine,
 la quiete d'una cosa già pensata.

Ah questa luce viva e chiara viene
 solo da te, sei tu così vicina
 al vero d'una cosa conosciuta,
 per nome hai una parola ch'è passata
 nell'intimo del cuore e s'è perduta.

Caduto è più che un segno della vita,
 riposi, dal viaggio sei tornata
 dentro di te, sei scesa in questa pura
 sostanza così tua, così romita
 nel silenzio dell'essere, (compiuta).

L'aria tace ed il tempo dietro a te
 si leva come un'arida montagna
 dove vaga il tuo spirito e si perde,
 un vento raro scivola e ristagna.



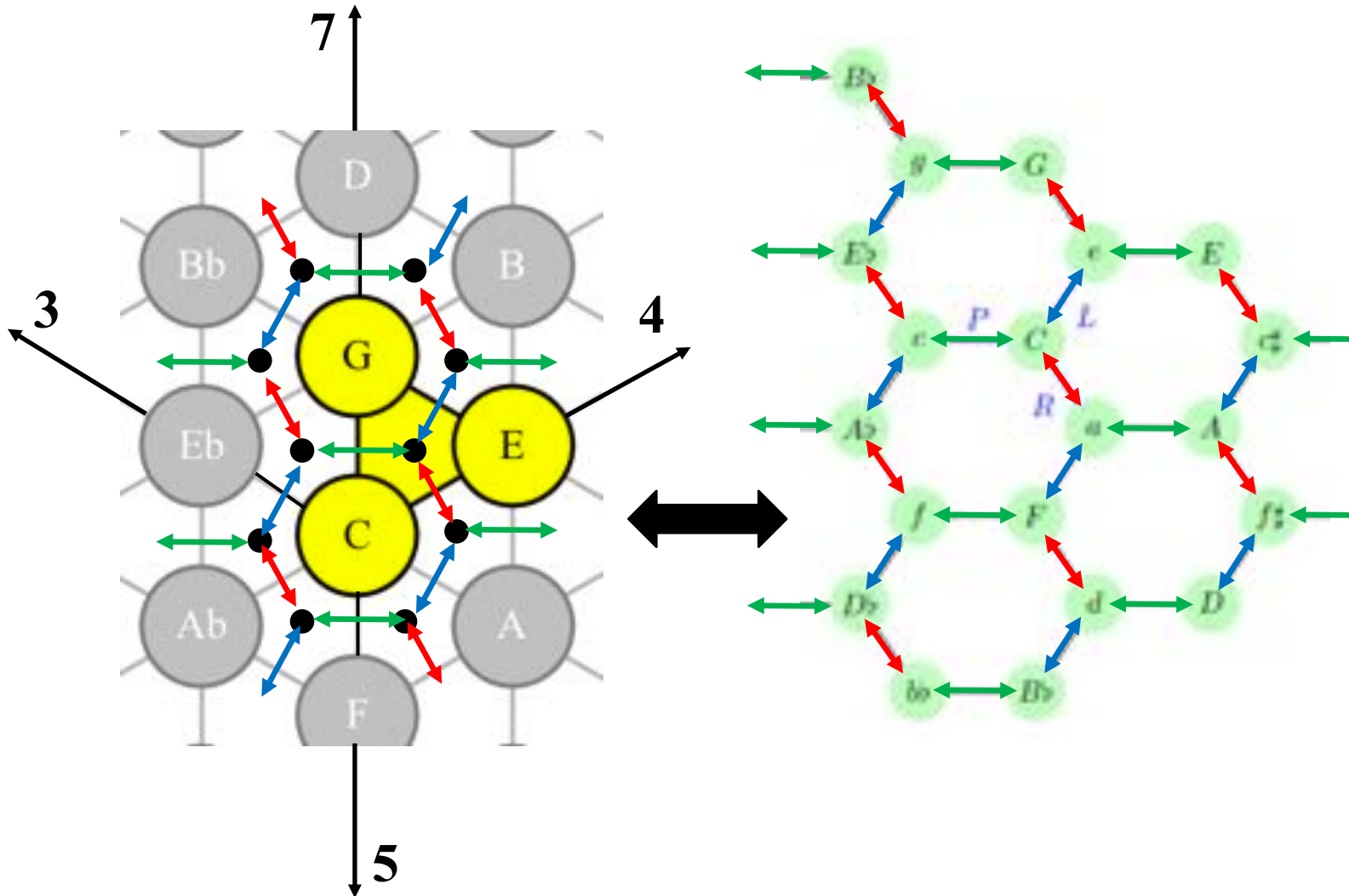
Luzi



Hamiltonian Song
on
Spinnennetz
2014

Lyrics by Mario Luzi
Music and Vocals by Moreno Andreatta
Graphics and Animation by Gilles Baroin
SpinnenTonnetz by Gilles Baroin, Hugò Seress
Original "Chicken Wire" graph by J.Douthett, P.Steinbach

Construction du maillage hexagonal à partir du Tonnetz



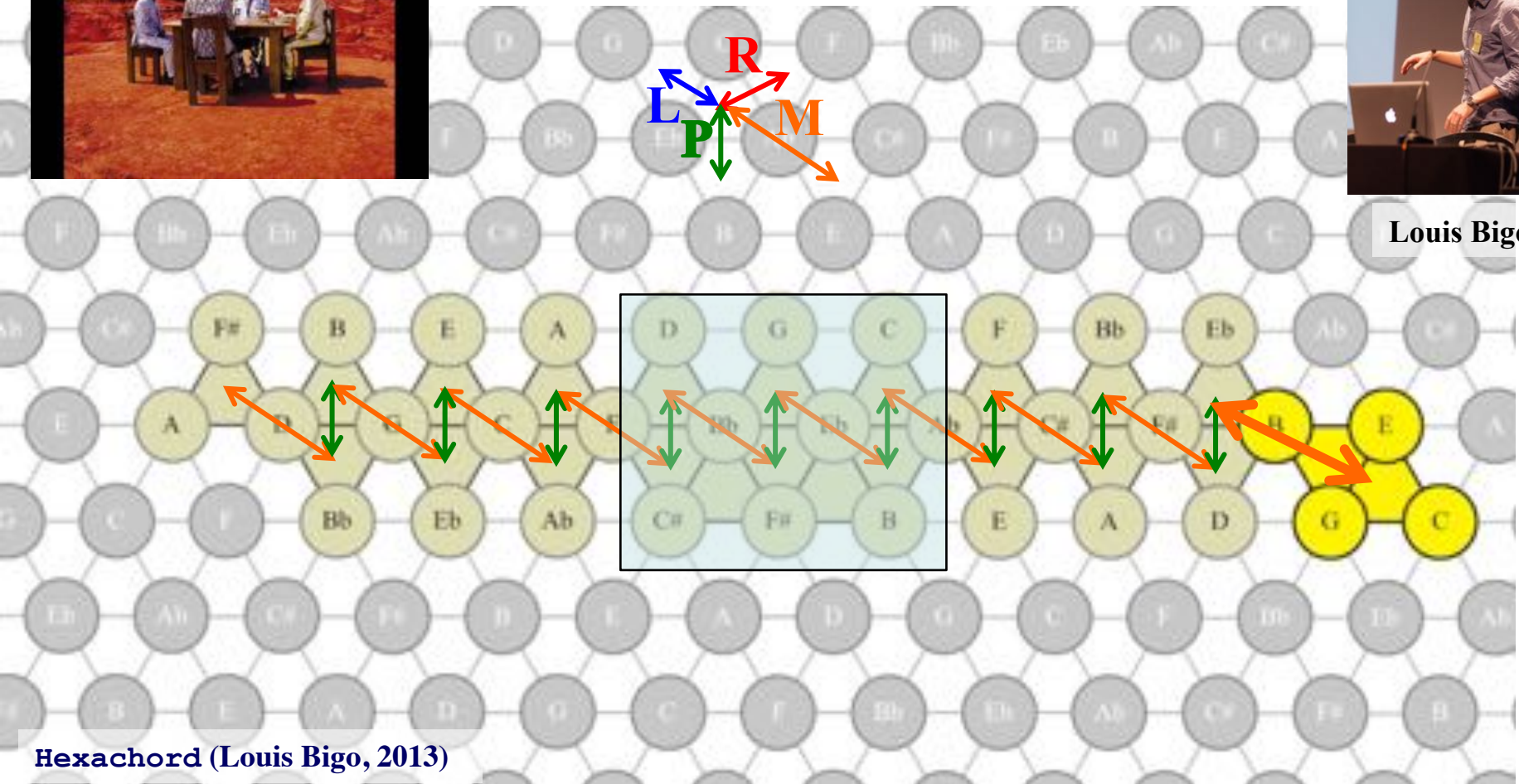
Symétries et procédés algorithmiques chez *Muse*



“Take a bow” (*Black Holes and Revelations*, 2006)



Louis Bigo



Hexachord (Louis Bigo, 2013)

axe temporel

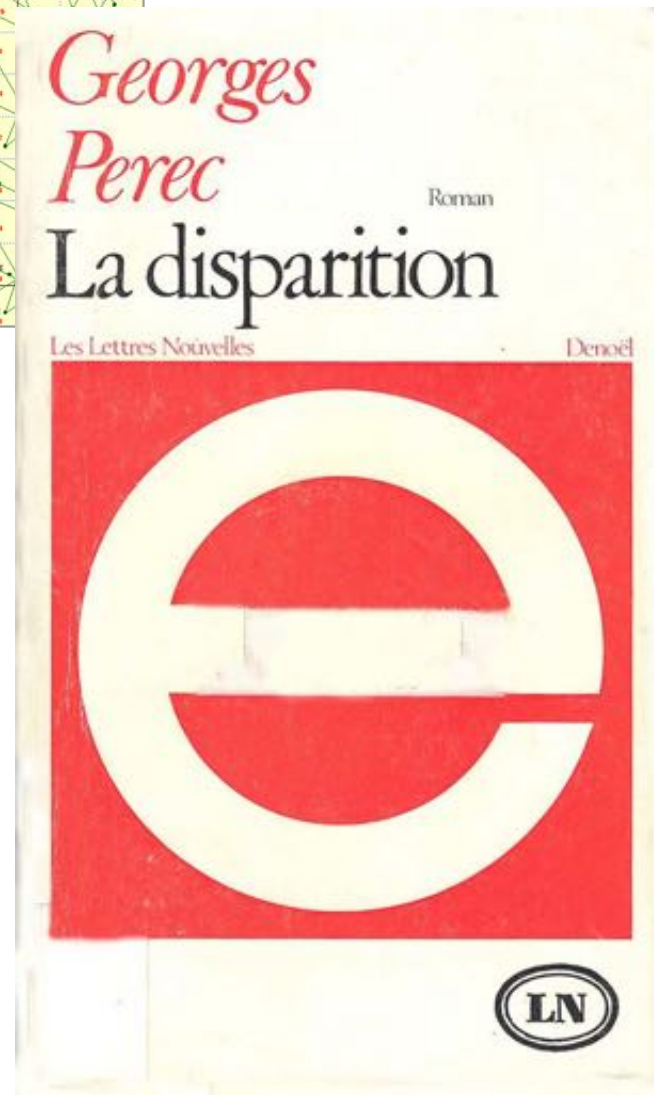
GEORGES PEREC
*La Vie
mode d'emploi*
romans



L'Arbre Presses

LES 100

RANK	FILM	DIRECTOR	BOX OFFICE (MILLIONS OF FRANCS)
1	LES 400 COUPS	JEAN-PIERRE L��AUD	110
2	LES 52 WEEKS	JEAN-PIERRE L��AUD	100
3	LES 300 COUPS	JEAN-PIERRE L��AUD	90
4	LES 200 COUPS	JEAN-PIERRE L��AUD	80
5	LES 100 COUPS	JEAN-PIERRE L��AUD	70
6	LES 50 COUPS	JEAN-PIERRE L��AUD	60
7	LES 40 COUPS	JEAN-PIERRE L��AUD	50
8	LES 30 COUPS	JEAN-PIERRE L��AUD	40
9	LES 20 COUPS	JEAN-PIERRE L��AUD	30
10	LES 10 COUPS	JEAN-PIERRE L��AUD	20
11	LES 5 COUPS	JEAN-PIERRE L��AUD	10
12	LES 2 COUPS	JEAN-PIERRE L��AUD	5
13	LES 1 COUP	JEAN-PIERRE L��AUD	2
14	LES 0 COUPS	JEAN-PIERRE L��AUD	0
15	LES -1 COUPS	JEAN-PIERRE L��AUD	-1
16	LES -2 COUPS	JEAN-PIERRE L��AUD	-2
17	LES -3 COUPS	JEAN-PIERRE L��AUD	-3
18	LES -4 COUPS	JEAN-PIERRE L��AUD	-4
19	LES -5 COUPS	JEAN-PIERRE L��AUD	-5
20	LES -6 COUPS	JEAN-PIERRE L��AUD	-6
21	LES -7 COUPS	JEAN-PIERRE L��AUD	-7
22	LES -8 COUPS	JEAN-PIERRE L��AUD	-8
23	LES -9 COUPS	JEAN-PIERRE L��AUD	-9
24	LES -10 COUPS	JEAN-PIERRE L��AUD	-10
25	LES -11 COUPS	JEAN-PIERRE L��AUD	-11
26	LES -12 COUPS	JEAN-PIERRE L��AUD	-12
27	LES -13 COUPS	JEAN-PIERRE L��AUD	-13
28	LES -14 COUPS	JEAN-PIERRE L��AUD	-14
29	LES -15 COUPS	JEAN-PIERRE L��AUD	-15
30	LES -16 COUPS	JEAN-PIERRE L��AUD	-16
31	LES -17 COUPS	JEAN-PIERRE L��AUD	-17
32	LES -18 COUPS	JEAN-PIERRE L��AUD	-18
33	LES -19 COUPS	JEAN-PIERRE L��AUD	-19
34	LES -20 COUPS	JEAN-PIERRE L��AUD	-20
35	LES -21 COUPS	JEAN-PIERRE L��AUD	-21
36	LES -22 COUPS	JEAN-PIERRE L��AUD	-22
37	LES -23 COUPS	JEAN-PIERRE L��AUD	-23
38	LES -24 COUPS	JEAN-PIERRE L��AUD	-24
39	LES -25 COUPS	JEAN-PIERRE L��AUD	-25
40	LES -26 COUPS	JEAN-PIERRE L��AUD	-26
41	LES -27 COUPS	JEAN-PIERRE L��AUD	-27
42	LES -28 COUPS	JEAN-PIERRE L��AUD	-28
43	LES -29 COUPS	JEAN-PIERRE L��AUD	-29
44	LES -30 COUPS	JEAN-PIERRE L��AUD	-30
45	LES -31 COUPS	JEAN-PIERRE L��AUD	-31
46	LES -32 COUPS	JEAN-PIERRE L��AUD	-32
47	LES -33 COUPS	JEAN-PIERRE L��AUD	-33
48	LES -34 COUPS	JEAN-PIERRE L��AUD	-34
49	LES -35 COUPS	JEAN-PIERRE L��AUD	-35
50	LES -36 COUPS	JEAN-PIERRE L��AUD	-36
51	LES -37 COUPS	JEAN-PIERRE L��AUD	-37
52	LES -38 COUPS	JEAN-PIERRE L��AUD	-38
53	LES -39 COUPS	JEAN-PIERRE L��AUD	-39
54	LES -40 COUPS	JEAN-PIERRE L��AUD	-40
55	LES -41 COUPS	JEAN-PIERRE L��AUD	-41
56	LES -42 COUPS	JEAN-PIERRE L��AUD	-42
57	LES -43 COUPS	JEAN-PIERRE L��AUD	-43
58	LES -44 COUPS	JEAN-PIERRE L��AUD	-44
59	LES -45 COUPS	JEAN-PIERRE L��AUD	-45
60	LES -46 COUPS	JEAN-PIERRE L��AUD	-46
61	LES -47 COUPS	JEAN-PIERRE L��AUD	-47
62	LES -48 COUPS	JEAN-PIERRE L��AUD	-48
63	LES -49 COUPS	JEAN-PIERRE L��AUD	-49
64	LES -50 COUPS	JEAN-PIERRE L��AUD	-50
65	LES -51 COUPS	JEAN-PIERRE L��AUD	-51
66	LES -52 COUPS	JEAN-PIERRE L��AUD	-52
67	LES -53 COUPS	JEAN-PIERRE L��AUD	-53
68	LES -54 COUPS	JEAN-PIERRE L��AUD	-54
69	LES -55 COUPS	JEAN-PIERRE L��AUD	-55
70	LES -56 COUPS	JEAN-PIERRE L��AUD	-56
71	LES -57 COUPS	JEAN-PIERRE L��AUD	-57
72	LES -58 COUPS	JEAN-PIERRE L��AUD	-58
73	LES -59 COUPS	JEAN-PIERRE L��AUD	-59
74	LES -60 COUPS	JEAN-PIERRE L��AUD	-60
75	LES -61 COUPS	JEAN-PIERRE L��AUD	-61
76	LES -62 COUPS	JEAN-PIERRE L��AUD	-62
77	LES -63 COUPS	JEAN-PIERRE L��AUD	-63
78	LES -64 COUPS	JEAN-PIERRE L��AUD	-64
79	LES -65 COUPS	JEAN-PIERRE L��AUD	-65
80	LES -66 COUPS	JEAN-PIERRE L��AUD	-66
81	LES -67 COUPS	JEAN-PIERRE L��AUD	-67
82	LES -68 COUPS	JEAN-PIERRE L��AUD	-68
83	LES -69 COUPS	JEAN-PIERRE L��AUD	-69
84	LES -70 COUPS	JEAN-PIERRE L��AUD	-70
85	LES -71 COUPS	JEAN-PIERRE L��AUD	-71
86	LES -72 COUPS	JEAN-PIERRE L��AUD	-72
87	LES -73 COUPS	JEAN-PIERRE L��AUD	-73</



*Le Château des
destins croisés, 1969*

La puissance de la combinatoire dans la création artistique :

L'Oulipo : « L'ouvroir de littérature potentielle »

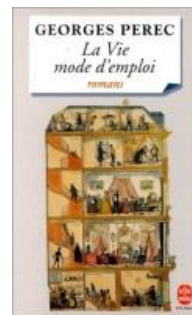
« Ce petit ouvrage permet à tout un chacun de composer à volonté cent mille milliards de sonnets, tous réguliers bien entendu. C'est somme toute une sorte de machine à fabriquer des poèmes, mais en nombre limité ; il est vrai que ce nombre, quoique limité, fournit de la lecture pour près de deux cents millions d'années (en lisant vingt-quatre heures sur vingt-quatre) »
(Raymond Queneau, *Cent mille milliards de poèmes*, 1961)

*Du jeune avantageux la nymphe était éprise
pour consommer un thé puis des petits gâteaux
le chauffeur indigène attendait dans la brise
il chantait tout de même oui mais il chantait faux
L'un et l'autre a raison non la foule insoumise
qui clochard devenant jetait ses oripeaux
un frère même bas est la part indécise
elle effraie le Berry comme les Morvandiaux
Devant la boue urbaine on retrousse sa cotte
aventures on eut qui s'y pique s'y frotte
l'autocar écrabouille un peu d'esprit latin
On regrette à la fin les agrestes bicoques
on mettait sans façon ses plus infectes loques
si la cloche se tait et son terlintintin*

[<http://x42.com/active/queneau.html>]



*Château des destins
croisés (1969)*



*La vie mode
d'emploi (1978)*



Raymond Queneau

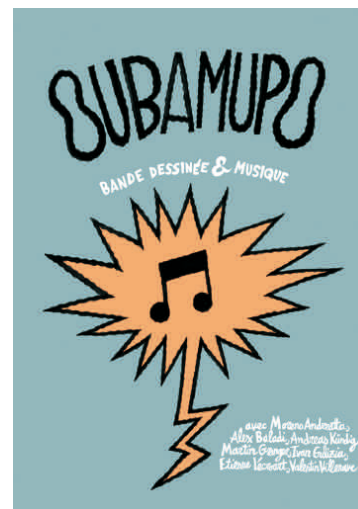
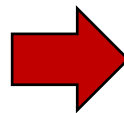


Italo Calvino



Georges Perec

De l'OuLiPo à l'OuMuPo (ouvroir de musique potentielle)



Valentin Villenave



Mike Solomon



Jean-François
Piette



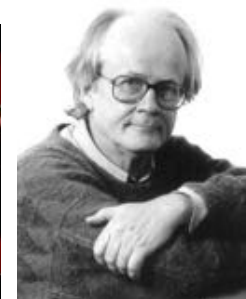
Martin
Granger



Joseph Boisseau

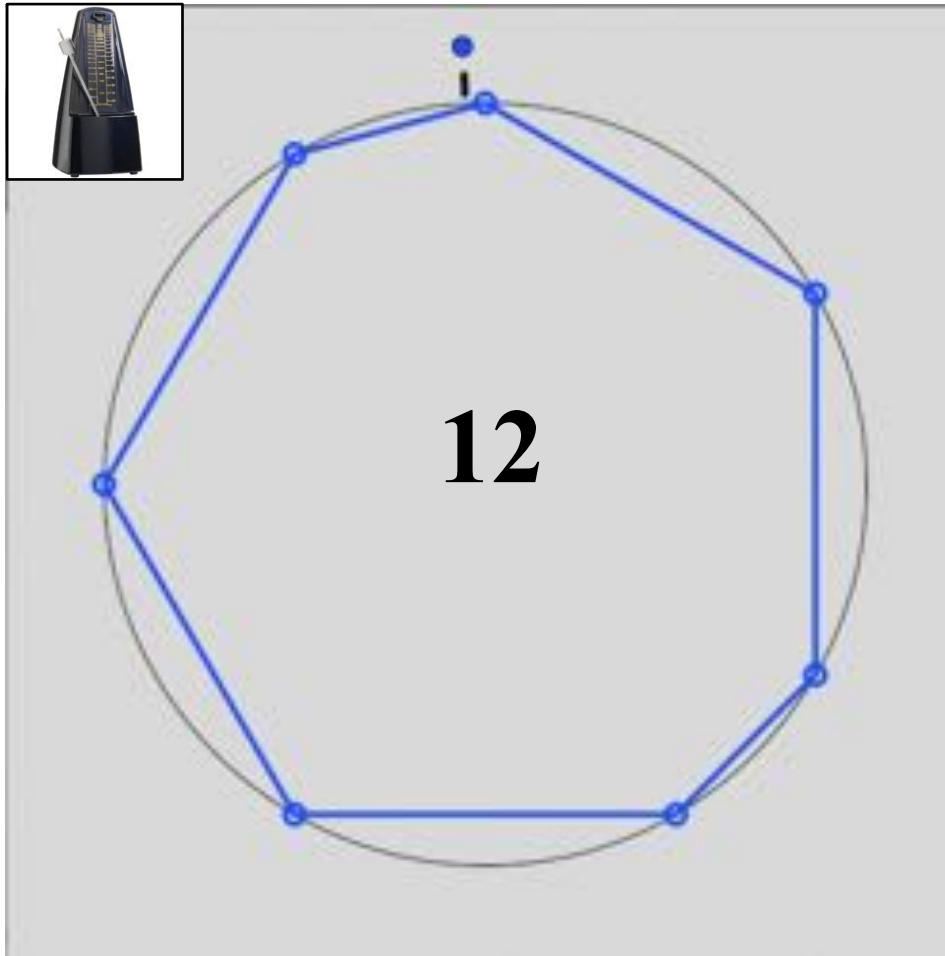


Moreno Andreatta

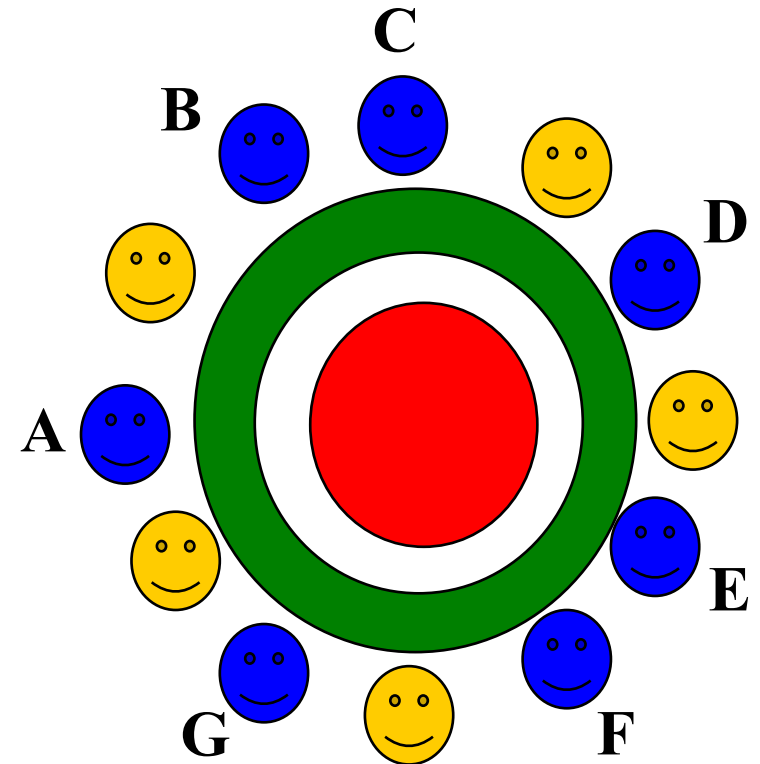


Tom Johnson

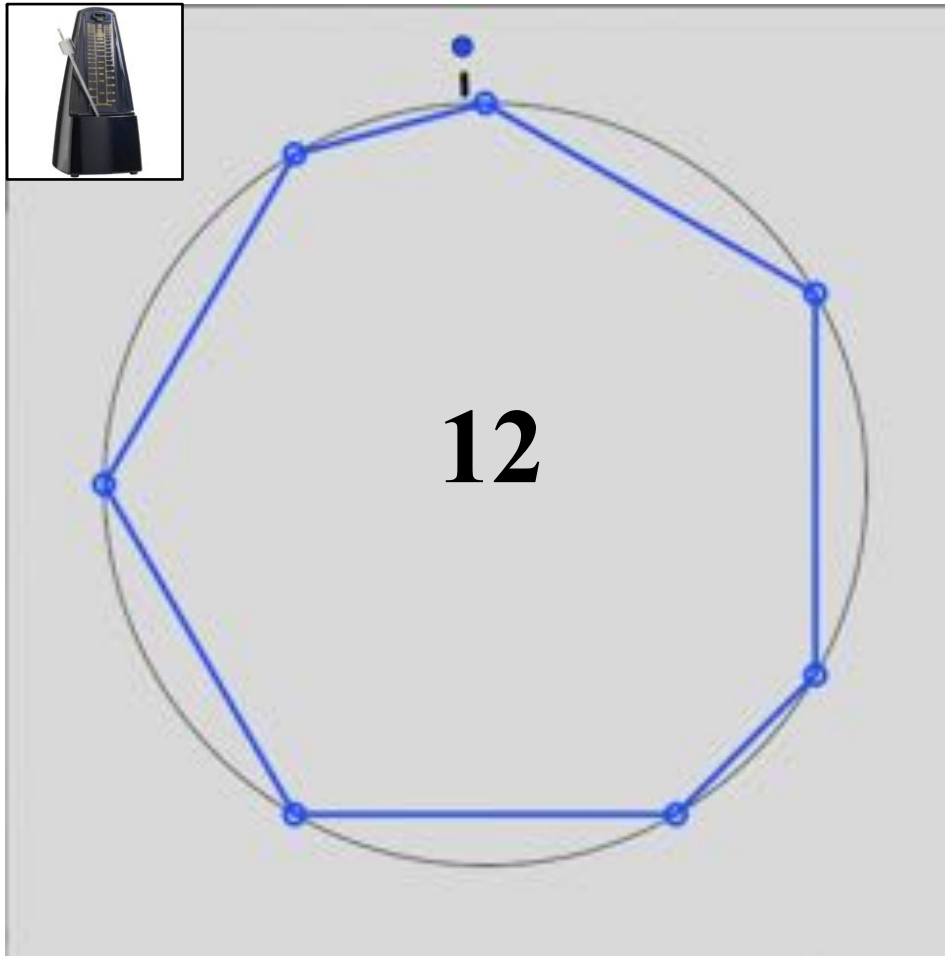
Représentation circulaire des rythmes



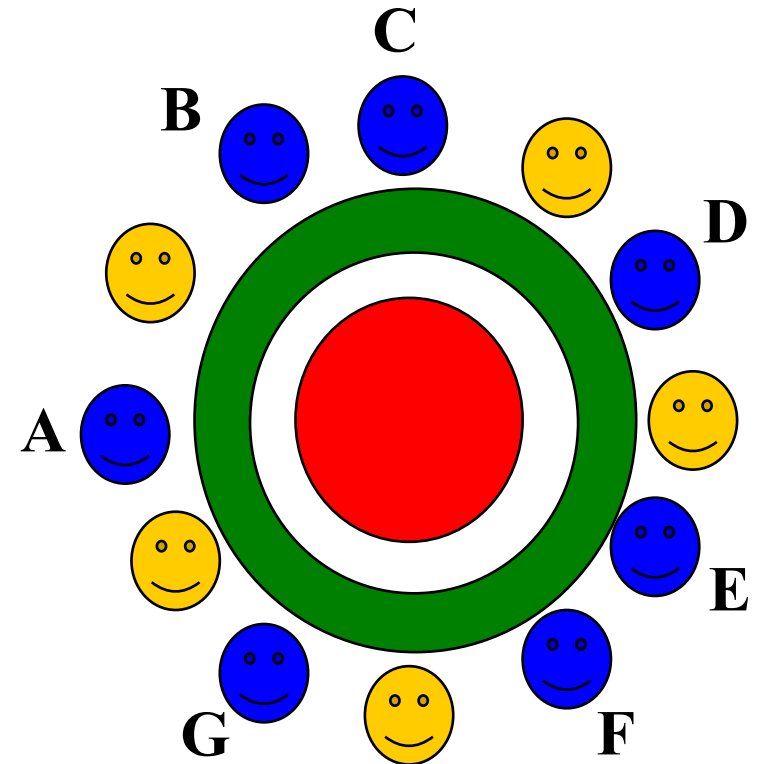
Abadja ou Bembé



Représentation circulaire des rythmes



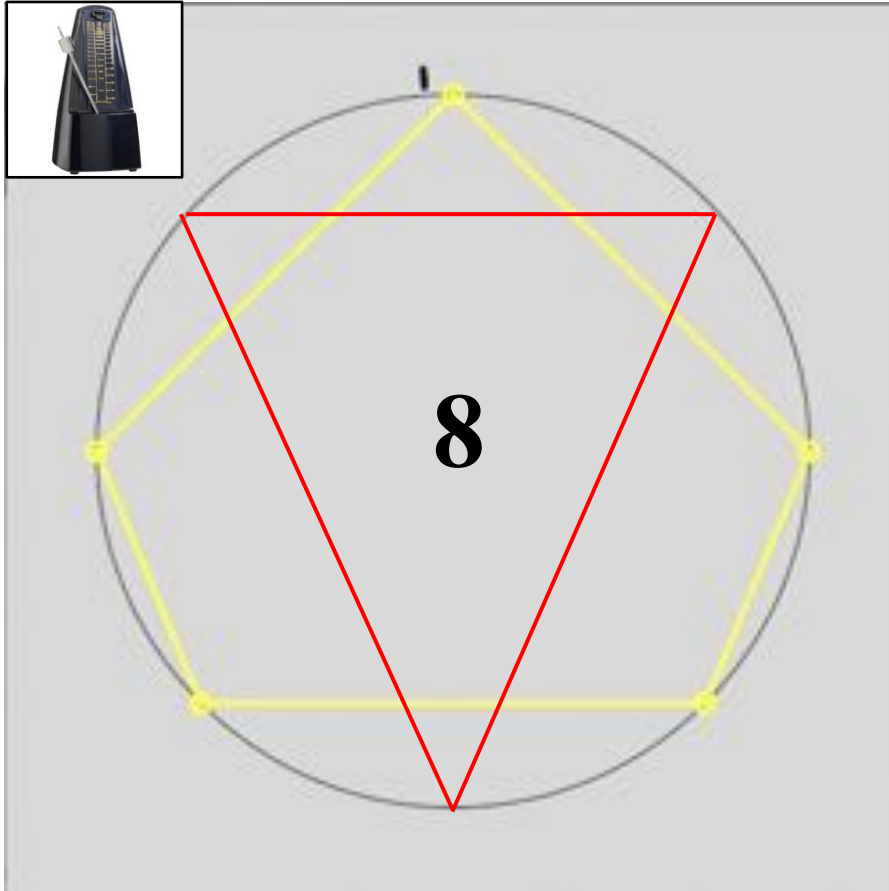
Abadja ou Bembé



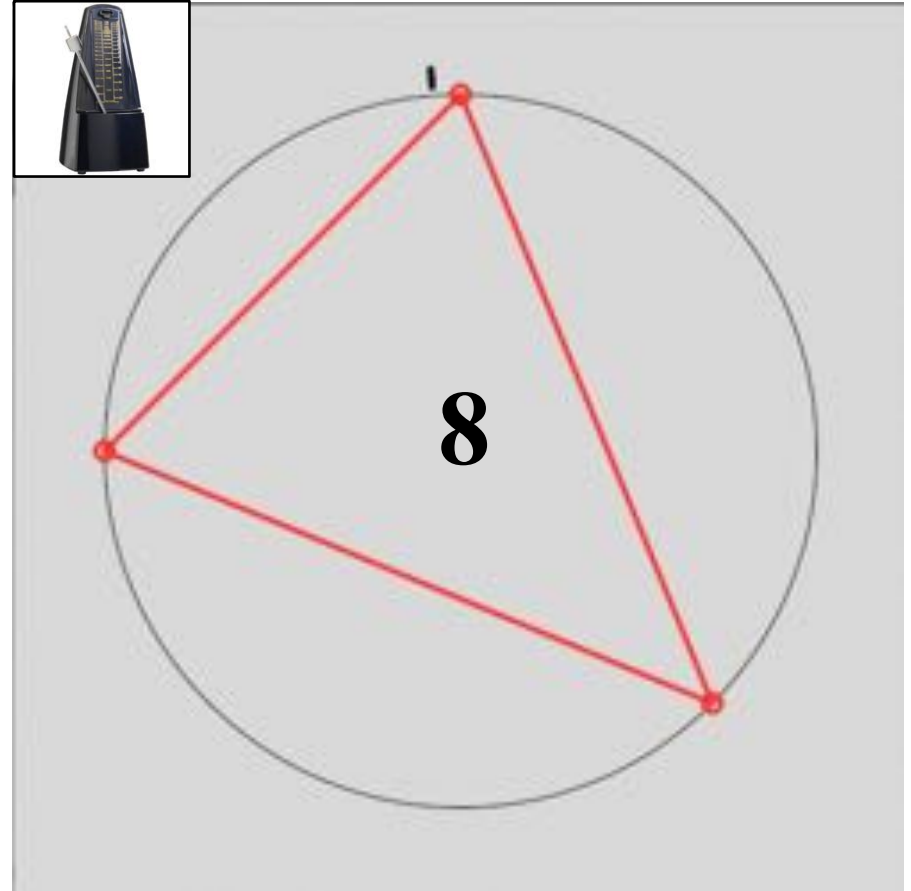
Dinner Table Problem

Rythmes afro-cubains et ensembles ME

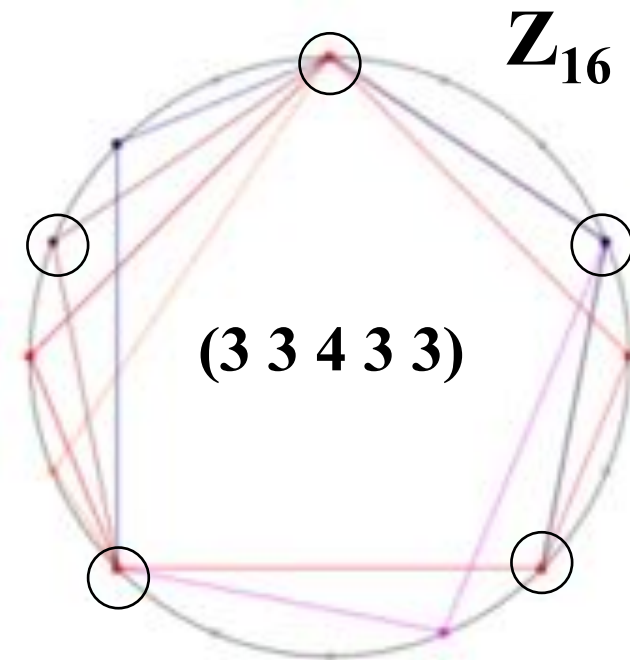
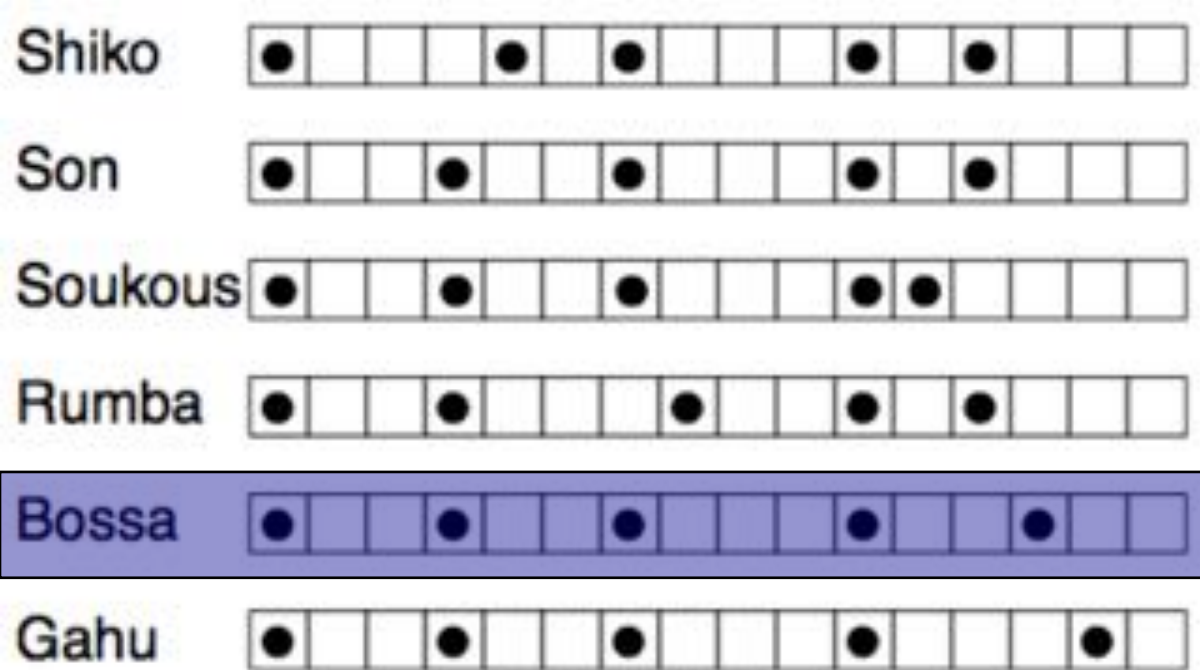
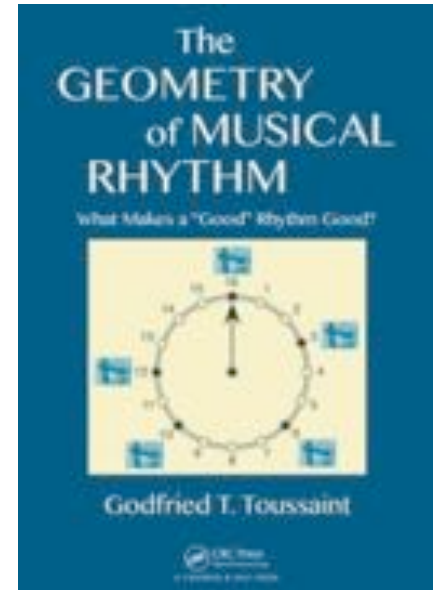
El cinquillo



El trecillo



The La géométrie des rythmes afro-cubains



Le « cercle rythmique » et ses rotations

CLAPPING MUSIC
FOR TWO PERFORMERS

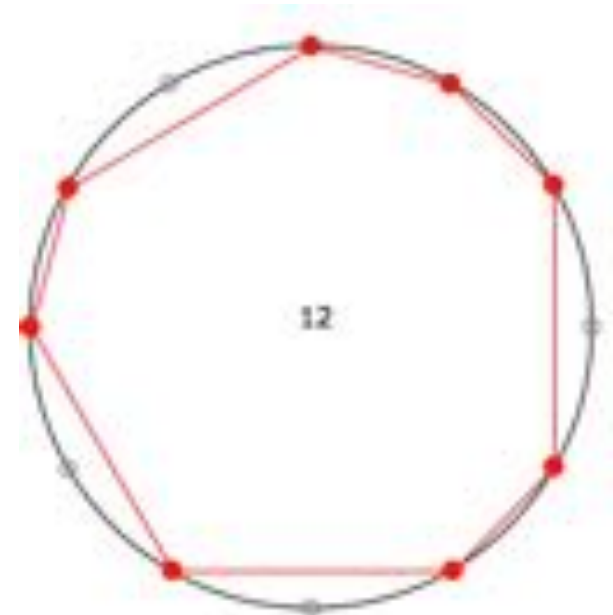
① J. 1114-100

CLAP 1
CLAP 2

The performers begin and end with both performers in unison at bar ①. The number of repeats of each bar should be fixed at twelve repeats per bar. Since the first performer's part does not change, it is up to the second performer to move from one bar to the next. The second performer should try to keep his or her downbeat where it is written, i.e. on the first beat of each measure (not on the first beat of the group of three claps), so that his downbeat always falls on a new beat of his or her unchanging pattern.

The choice of a particular clapping sound, i.e. with cupped or flat hands is left up to the performers, whichever sound is chosen, both performers should try to get the same one so that their two parts will blend to produce one overall exciting pattern.

Steve Reich 11/72
11-copied 1/79



Le « cercle rythmique » et ses rotations

CLAPPING MUSIC

FOR TWO PERFORMERS

♩ = 166

CLAP 1
CLAP 2

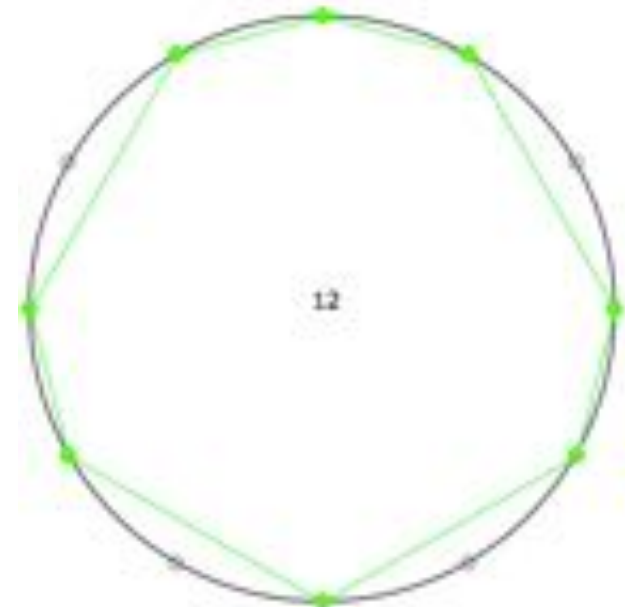
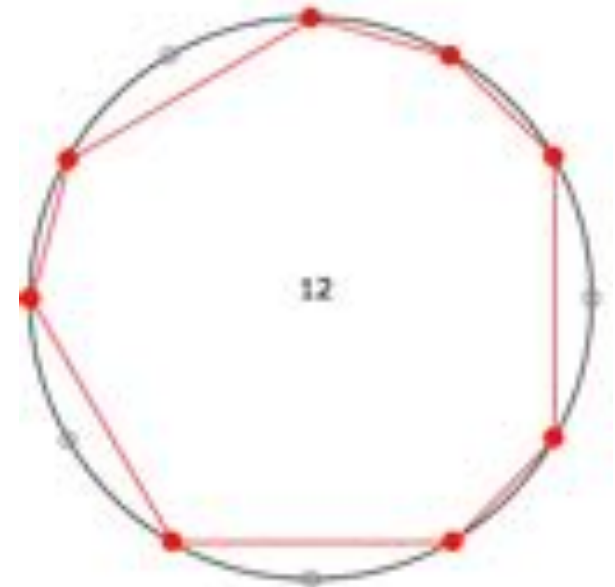
Repeat back to ①, then end

The performers begin and end with both performers in unison at bar ①. The number of repeats of each bar should be fixed at twelve repeats per bar. Since the first performer's part does not change, it is up to the second performer to move from one bar to the next. The second performer should try to keep his or her downbeat where it is written, i.e., on the first beat of each measure (not on the first beat of the group of three claps), so that his or her part always falls on a new beat of the first performer's unchanging pattern.

The choice of a particular clapping sound, i.e., with cupped or flat hands is left up to the performers, whichever sound is chosen, both performers should try to get the same one so that their two parts will blend to produce one overall exciting pattern.

Clapping Music (1972)

*Steve Reich 12/72
revised 1/79*



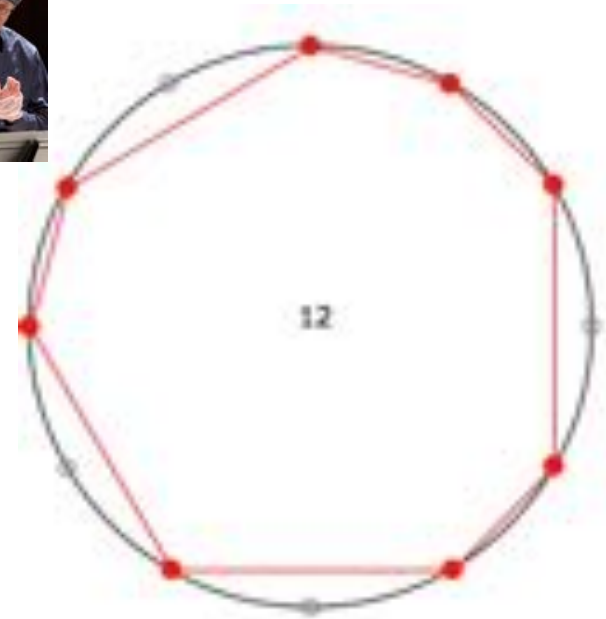
Le « cercle rythmique » et ses rotations

CLAPPING MUSIC

FOR TWO PERFORMERS



Handwritten musical notation for two clappers (CLAP 1 and CLAP 2) in 3/4 time. The notation is divided into measures, with some measures highlighted by red, green, and orange boxes. The first measure is circled in red. The notation includes various rhythmic patterns and rests.



The performance begins and ends with both performers in unison at bar ⑤. The number of repeats of each bar should be fixed at twelve repeats per bar. Since the first performer's part does not change, it is up to the second performer to move from one bar to the next. The second performer should try to keep his or her downbeat where it is written, i.e. on the first beat of each measure (not on the first beat of the group of three claps), so that his downbeat always falls on a new beat of his or her unchanging pattern.

The choice of a particular clapping sound, i.e. with cupped or flat hands is left up to the performers, whichever sound is chosen, both performers should try to get the same one so that their two parts will blend to produce one overall exciting pattern.

Clapping Music (1972)

*Steve Reich 1972
re-copied 1979*

Gerubach's Scrolling Score Project
<http://www.gerubach.com>

Hexachord (by Louis Bigo, 2013)

Merci de votre attention !

