MTO a journal of the Society for Music Theory

MTO 17.1 Examples: Peck, A GAP Tutorial for Transformational Music Theory

(Note: audio, video, and other interactive examples are only available online)
http://www.mtosmt.org/issues/mto.11.17.1/mto.11.17.1.peck.php

Example 1. The GAP welcome screen

Table 1. Mapping of D_6 to G under *pi*

$$
\begin{array}{lcl}
f1 & \mapsto & (2,3) \\
f1 \cdot f1 & \mapsto & (2,3)(2,3) = (\,) \\
f2 & \mapsto & (1,2,3) \\
f2 \cdot f2 & \mapsto & (1,2,3)(1,2,3) = (1,3,2) \\
f1 \cdot f2 & \mapsto & (2,3)(1,2,3) = (1,2) \\
f2 \cdot f1 & \mapsto & (1,2,3)(2,3) = (3,1)
\end{array}
$$

Example 2. A sample Sage Notebook

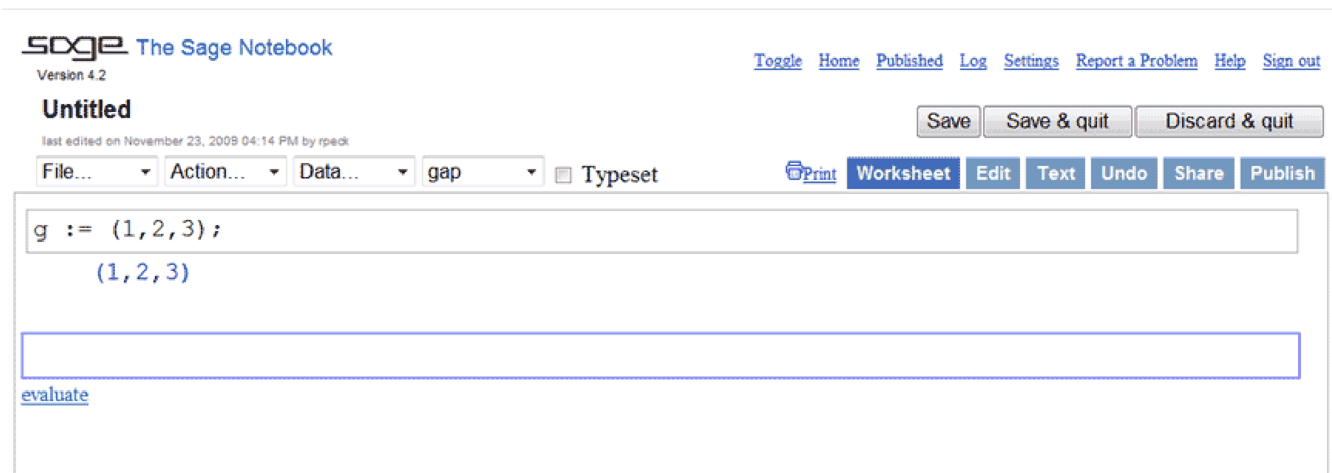
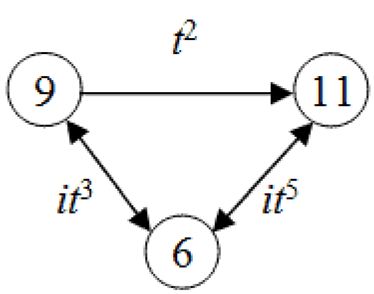


Figure 1. A sample K-net



Example 3. Schoenberg, Sechs kleine Klavierstücke, op. 19, no. 6, measures 1–6 (following Lambert 2002)

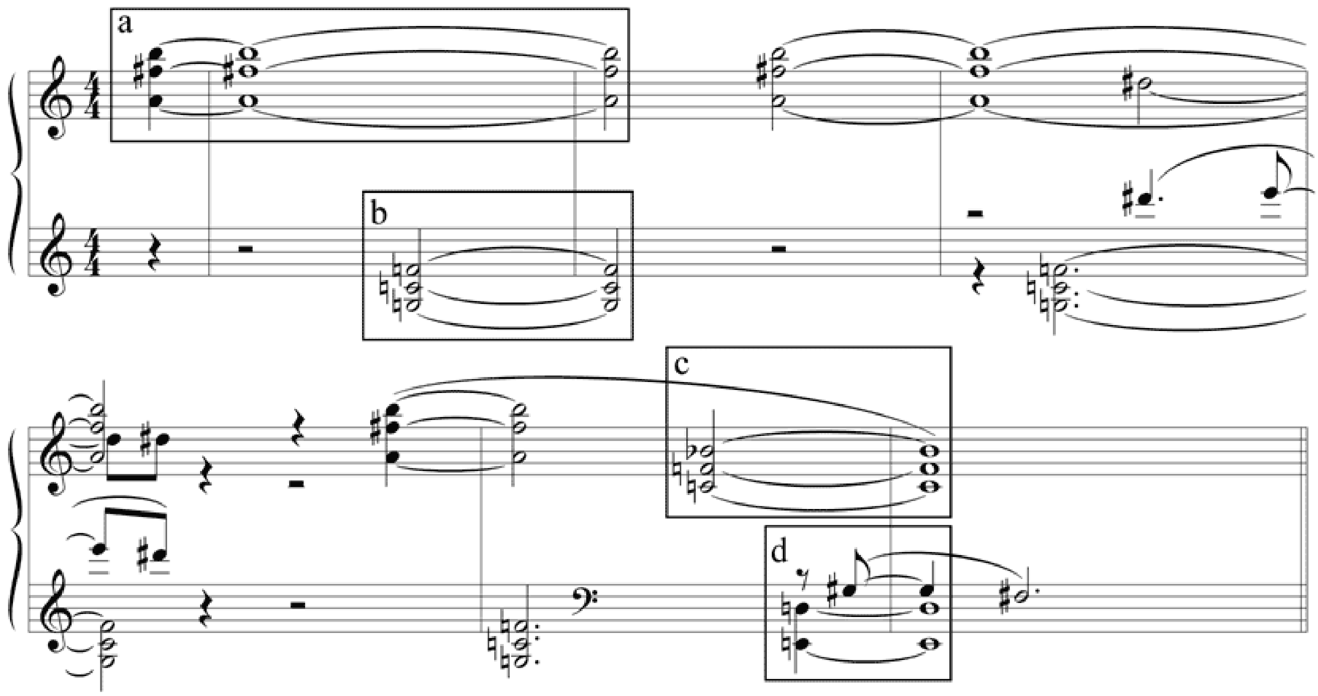


Figure 2. Two positively isographic K-nets from Lambert 2002

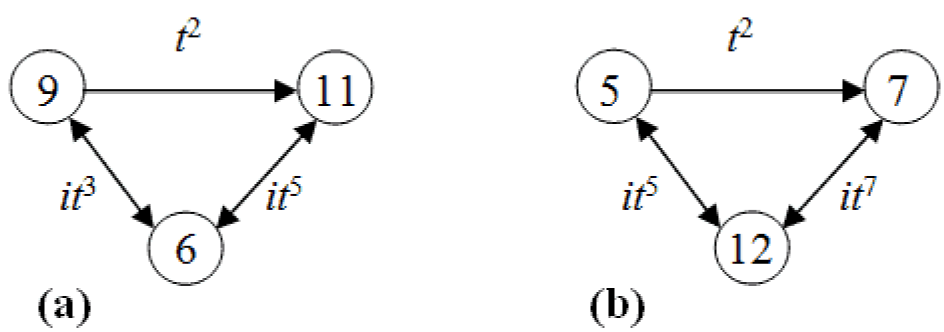


Figure 3. Two negatively isographic K-nets from Lambert 2002

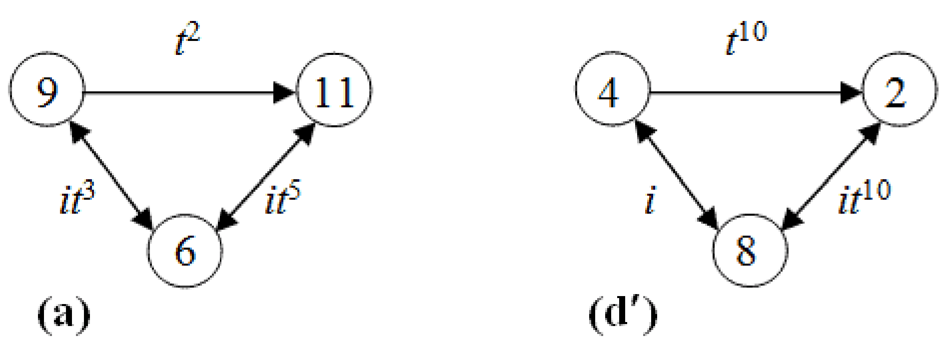


Figure 4. Recursion between network (a) and hyper-network (r)

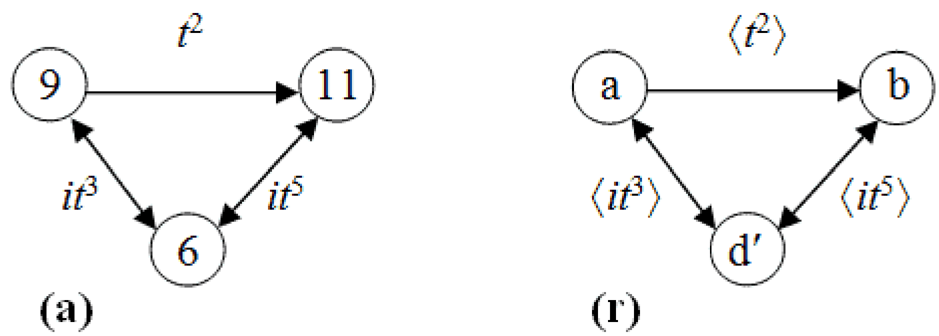


Figure 5. Network (b) relates to (c) by $\langle t^{10} \rangle$, but congruent nodes relate by t^5

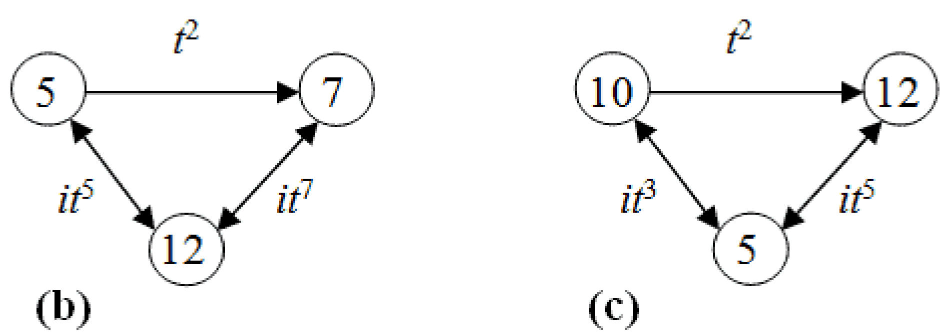


Table 2. Mapping of *K* to [1 .. 24]

C+	$\mapsto$	1	G-	$\mapsto$	9
C#+	$\mapsto$	2	Ab-	$\mapsto$	13
D+	$\mapsto$	4	A-	$\mapsto$	17
Eb+	$\mapsto$	7	Bb-	$\mapsto$	21
E+	$\mapsto$	11	B-	$\mapsto$	24
F+	$\mapsto$	15	C-	$\mapsto$	20
F#+	$\mapsto$	19	C#-	$\mapsto$	16
G+	$\mapsto$	23	D-	$\mapsto$	12
Ab+	$\mapsto$	22	Eb-	$\mapsto$	8
A+	$\mapsto$	18	E-	$\mapsto$	5
Bb+	$\mapsto$	14	F-	$\mapsto$	3
B+	$\mapsto$	10	F#-	$\mapsto$	6

Table 3. Alternate mapping of *K* to [1 .. 24]

C#+	$\mapsto$	1	C#-	$\mapsto$	13
D+	$\mapsto$	2	D-	$\mapsto$	14
Eb+	$\mapsto$	3	Eb-	$\mapsto$	15
E+	$\mapsto$	4	E-	$\mapsto$	16
F+	$\mapsto$	5	F-	$\mapsto$	17
F#+	$\mapsto$	6	F#-	$\mapsto$	18
G+	$\mapsto$	7	G-	$\mapsto$	19
Ab+	$\mapsto$	8	Ab-	$\mapsto$	20
A+	$\mapsto$	9	A-	$\mapsto$	21
Bb+	$\mapsto$	10	Bb-	$\mapsto$	22
B+	$\mapsto$	11	B-	$\mapsto$	23
C+	$\mapsto$	12	C-	$\mapsto$	24

Table 4. Isomorphism classes of the nonabelian subgroups of order 24 in *M* with an element of order 12

$$
\begin{aligned}
T/I &\cong [24,6] \cong D_{24} \\
T/I_{215} &\cong [24,5] \cong D_6 \times C_4 \\
T/I_{216} &\cong [24,10] \cong D_8 \times C_3 \\
T/I_{217} &\cong [24,4] \cong Dic_6 \\
T/I_{218} &\cong [24,11] \cong Q_8 \times C_3 \\
T/I_{219} &\cong [24,1] \cong C_3 \rtimes C_8
\end{aligned}
$$