1. $F: I \to \mathbb{R}$, $\quad x_{n+1} = F(x_n)$, $(n \bmod 7)$

$$x_4 < x_2 < x_0 < x_6 < x_1 < x_3 < x_5$$

$I_0 = [x_4, x_2]$, $\quad I_1 = [x_2, x_0]$

$I_2 = [x_0, x_6]$, $\quad I_3 = [x_6, x_1]$

$I_4 = [x_1, x_3]$, $\quad I_5 = [x_3, x_5]$.

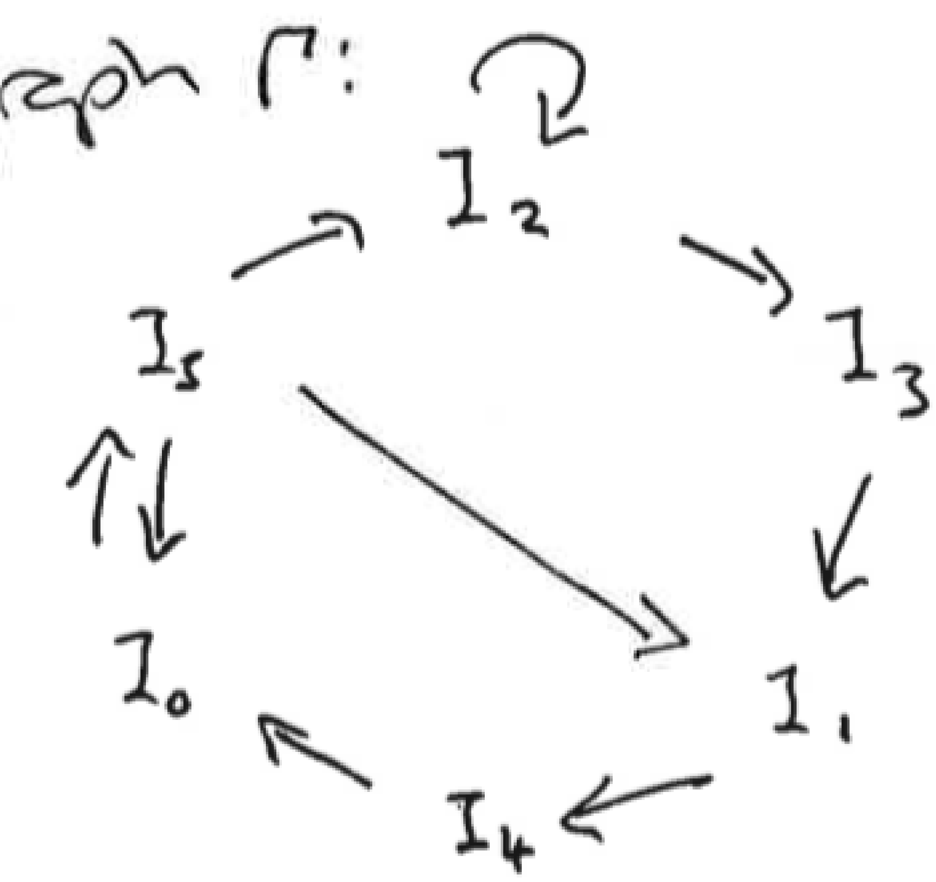
F-covering relations

$F(I_0) \supseteq [x_3, x_5] = I_5$, $\quad F(I_1) \supseteq [x_1, x_3] = I_4$

$F(I_2) \supseteq [x_0, x_1] = I_2 \cup I_3$, $\quad F(I_3) \supseteq [x_2, x_0] = I_1$

$F(I_4) \supseteq [x_4, x_2] = I_0$, $\quad F(I_5) \supseteq [x_4, x_6] = I_0 \cup I_1 \cup I_2$.

Transition graph Γ:



b) F is semiconjugate to the SSFT σ_A where A is the transition matrix for F and the intervals I_i.

Hence F has at least as many periodic orbits as σ_A.

N-cycles can be identified by inspection of the transition graph Γ:

$\underline{N=2}$

$$I_0 I_5 \rightarrow I_0$$

$\underline{N=4}$

$$I_5 I_1 I_4 I_0 \rightarrow I_5$$

$\underline{N=6}$

$$I_5 I_1 I_4 I_0 I_5 I_0 \rightarrow I_5$$

$\underline{N \geq 8}$

$I_3 I_1 I_4 I_0 I_5 I_2^{N-6} \rightarrow I_3$ is a period N orbit in $\Sigma_{6,A}$.

b) By inspection, there are no closed paths of length 3 or length 5 in Γ. Hence F does not have a 3-cycle or a 5-cycle.

c) Construct a graph for F.

Simplest construction is piecewise linear