

Prof. V.M. Gadgil
lect No. 31
Date: 12/03/2010

LECTURE 31

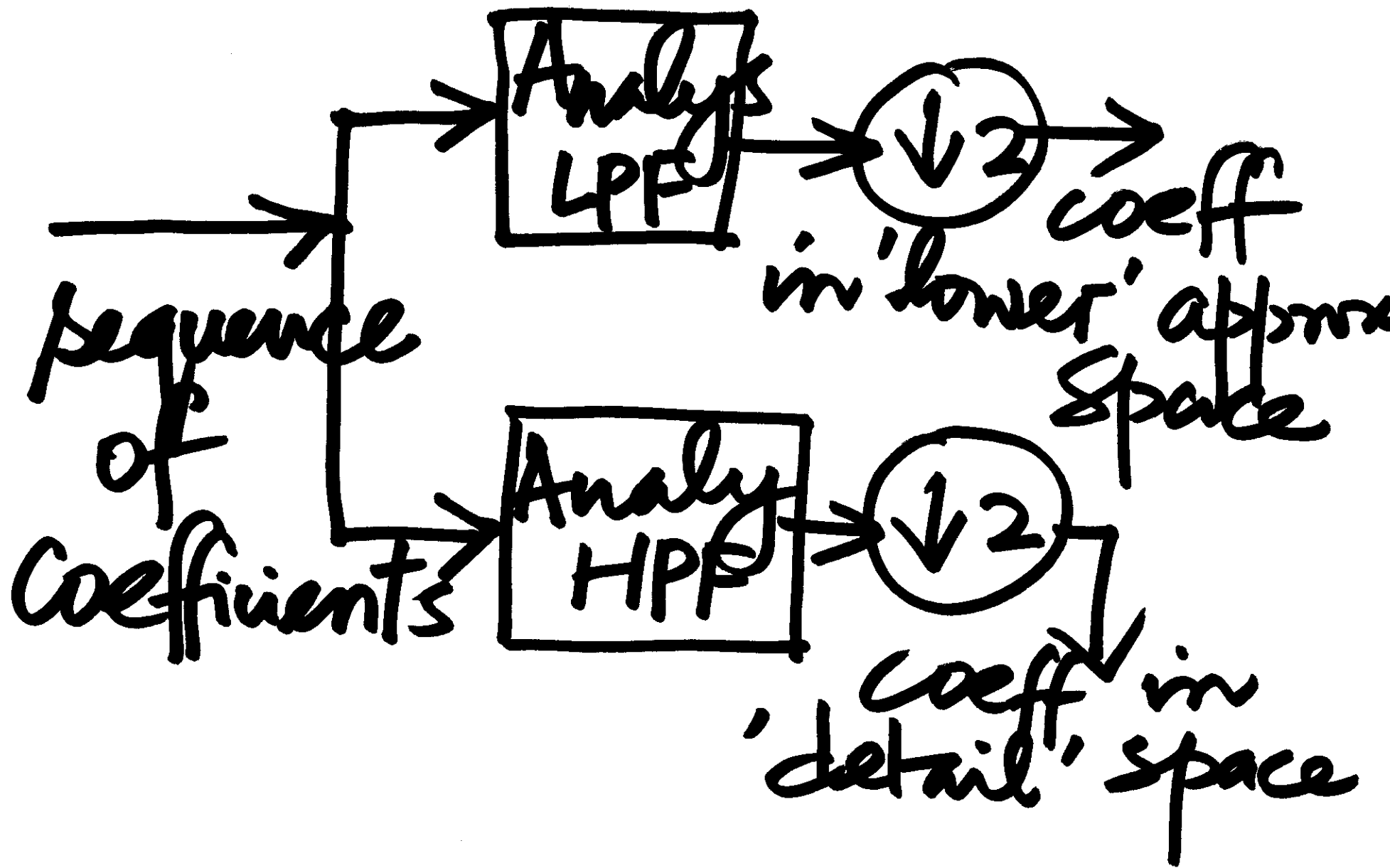
THE WAVE PACKET TRANSFORM

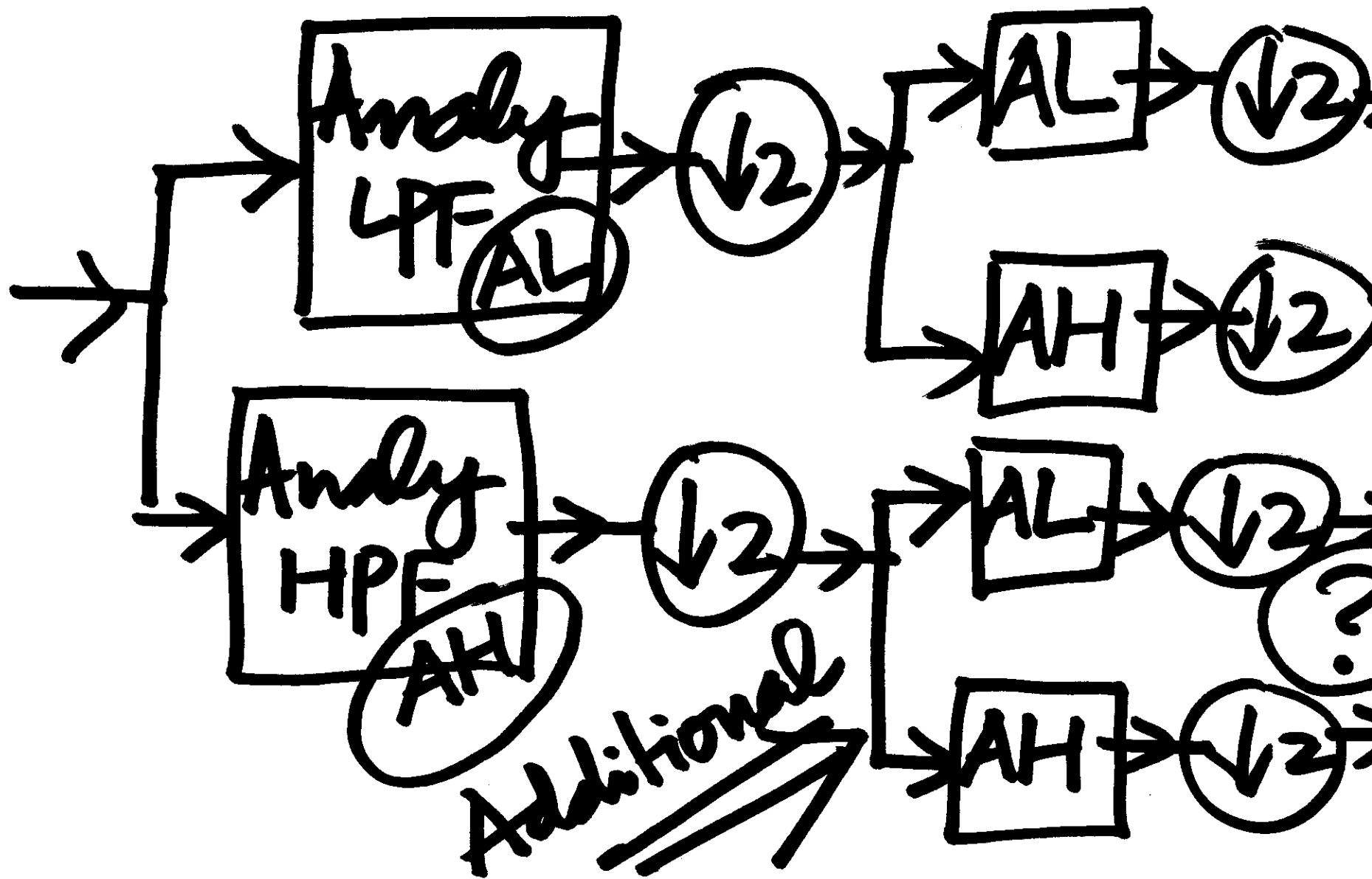
$\dots \subset V_{-2} \subset V_{-1} \subset V_0 \subset V_1 \subset V_2 \subset \dots$

Detail (incremental) subspace not decomposed
 V_0 (approximation subspace)
 V_1 is decomposed
 V_2 is decomposed

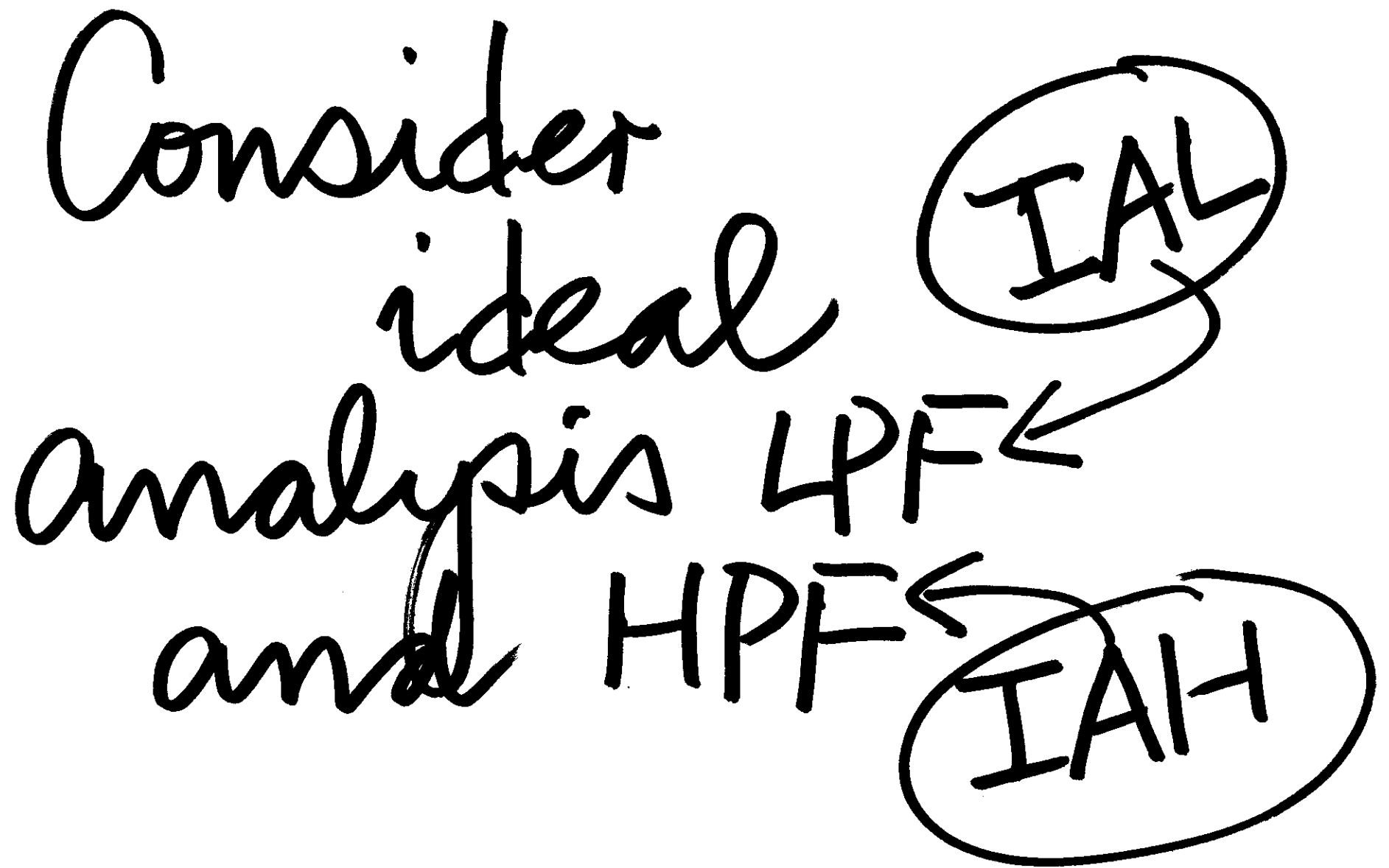
Idea:

Decompose the
incremental or detail
Subspace also.



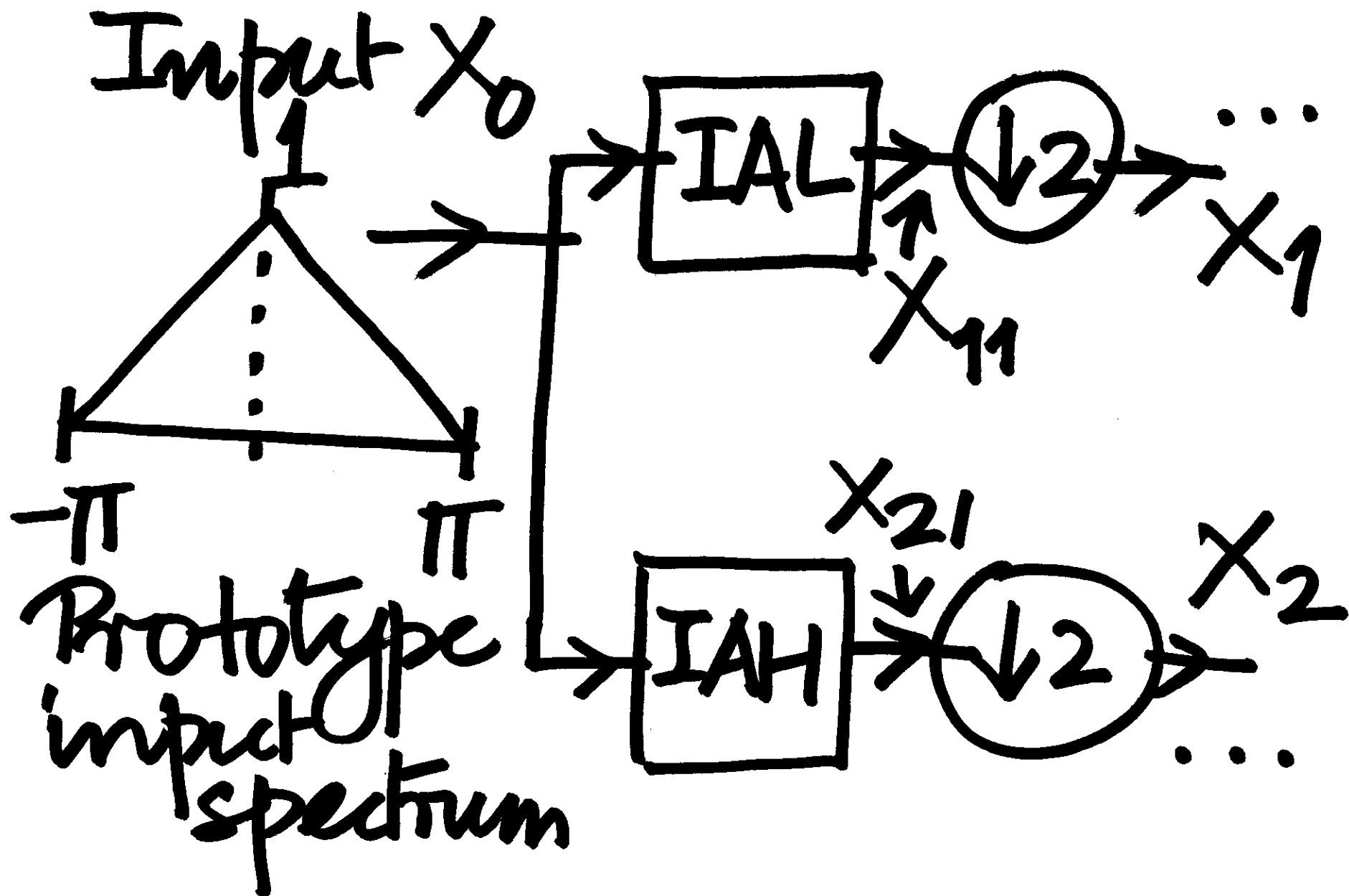


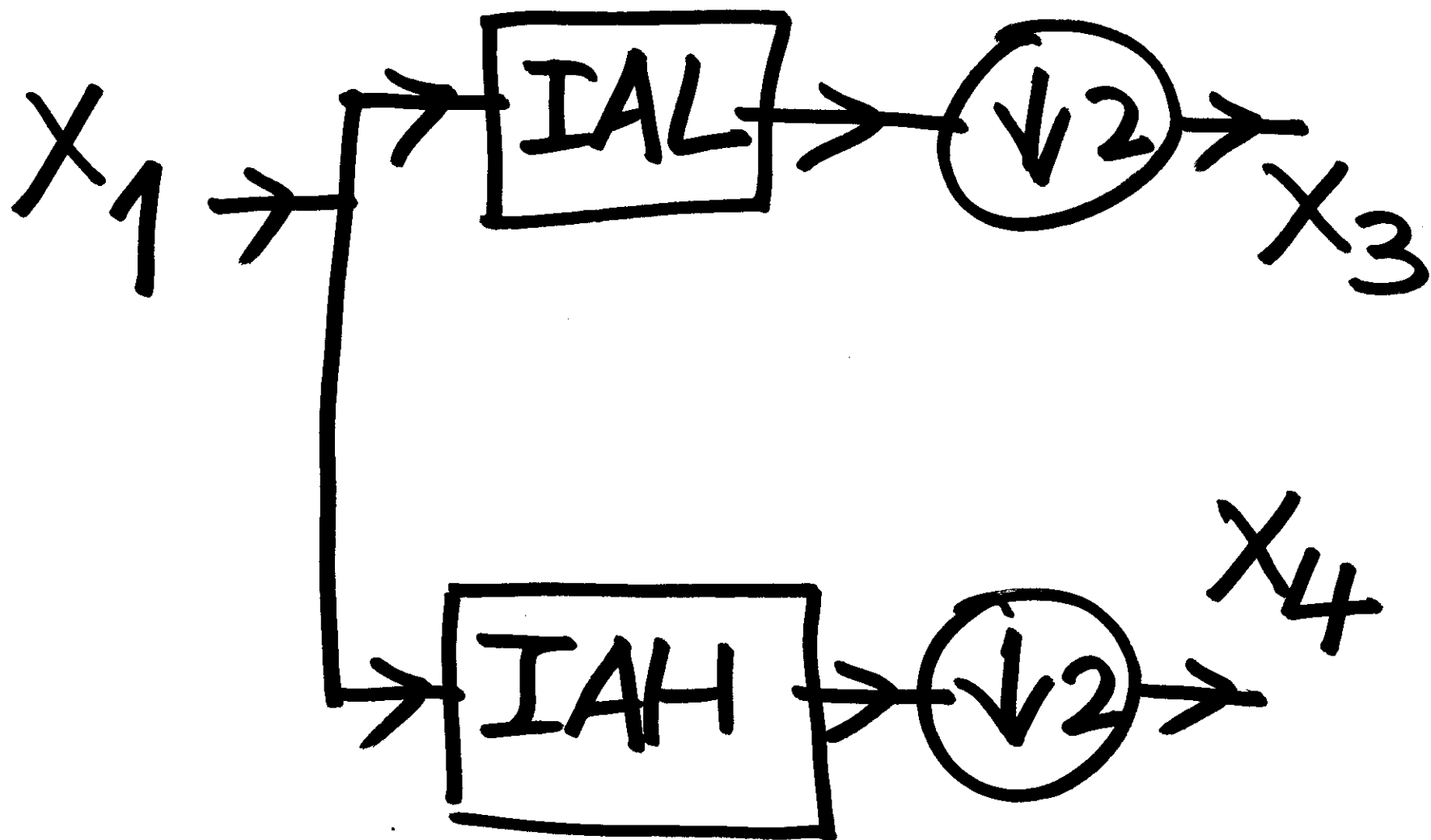
Consider
ideal
analysis LPF ←
and HPF ←

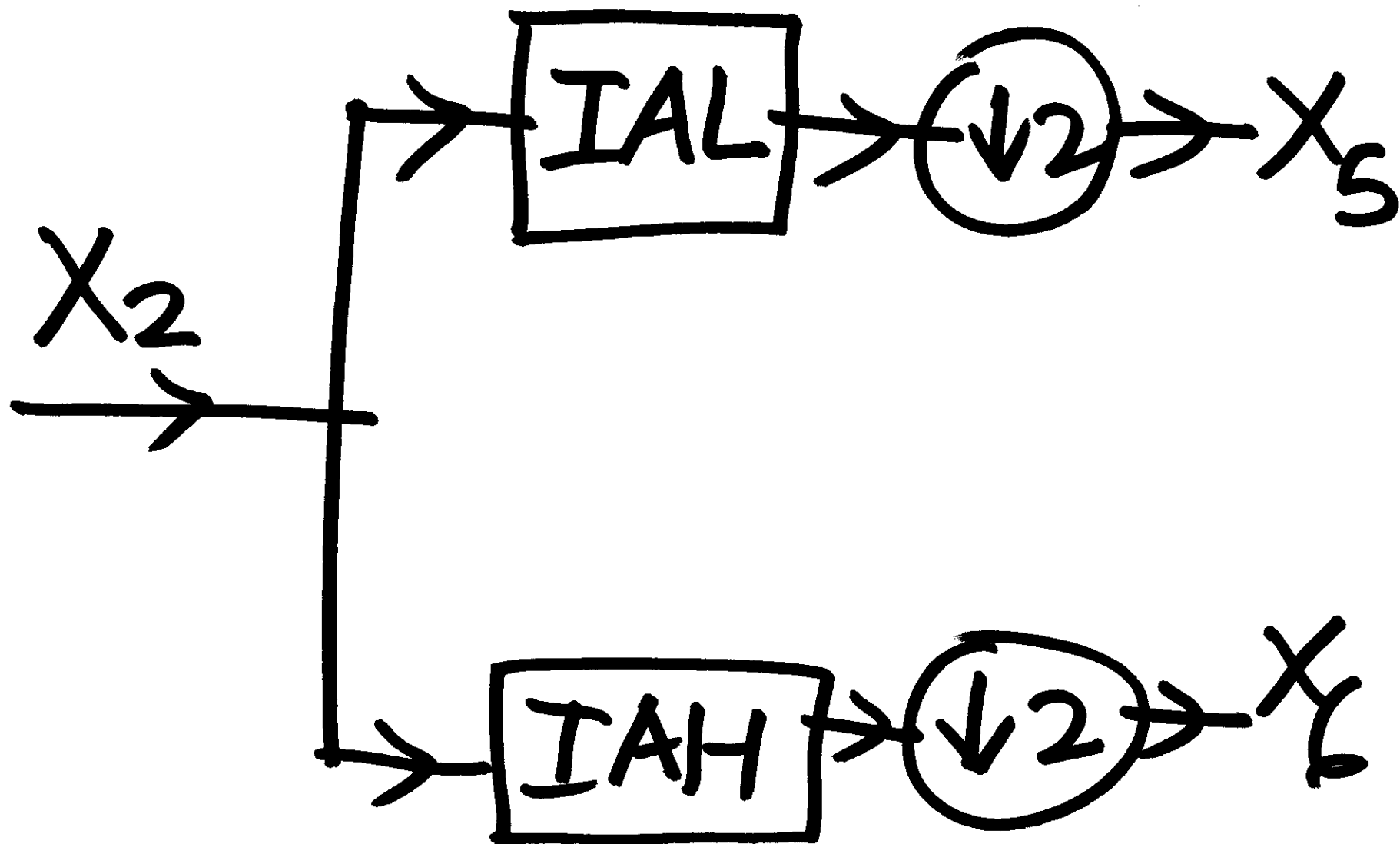


IAL

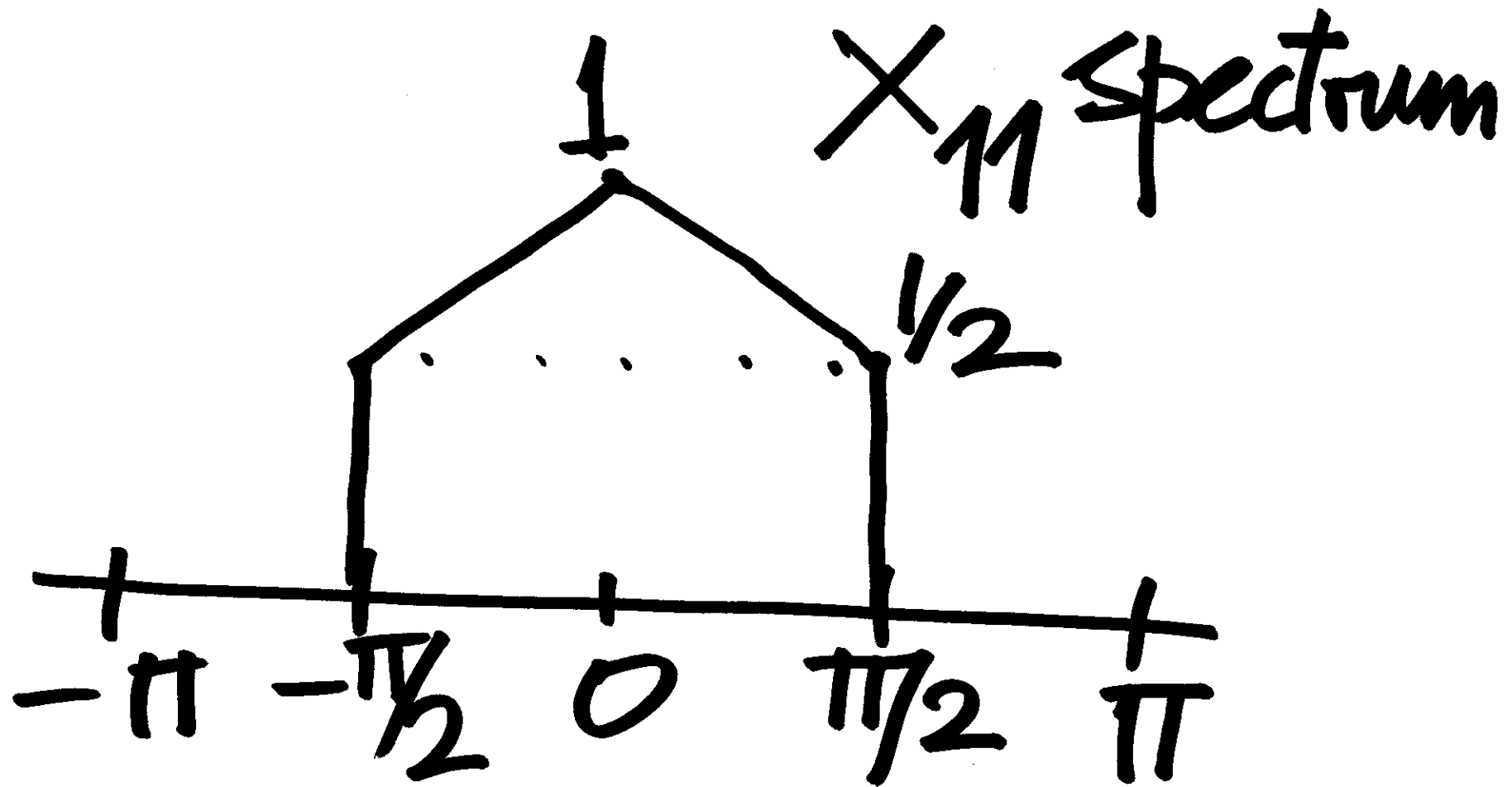
IAH



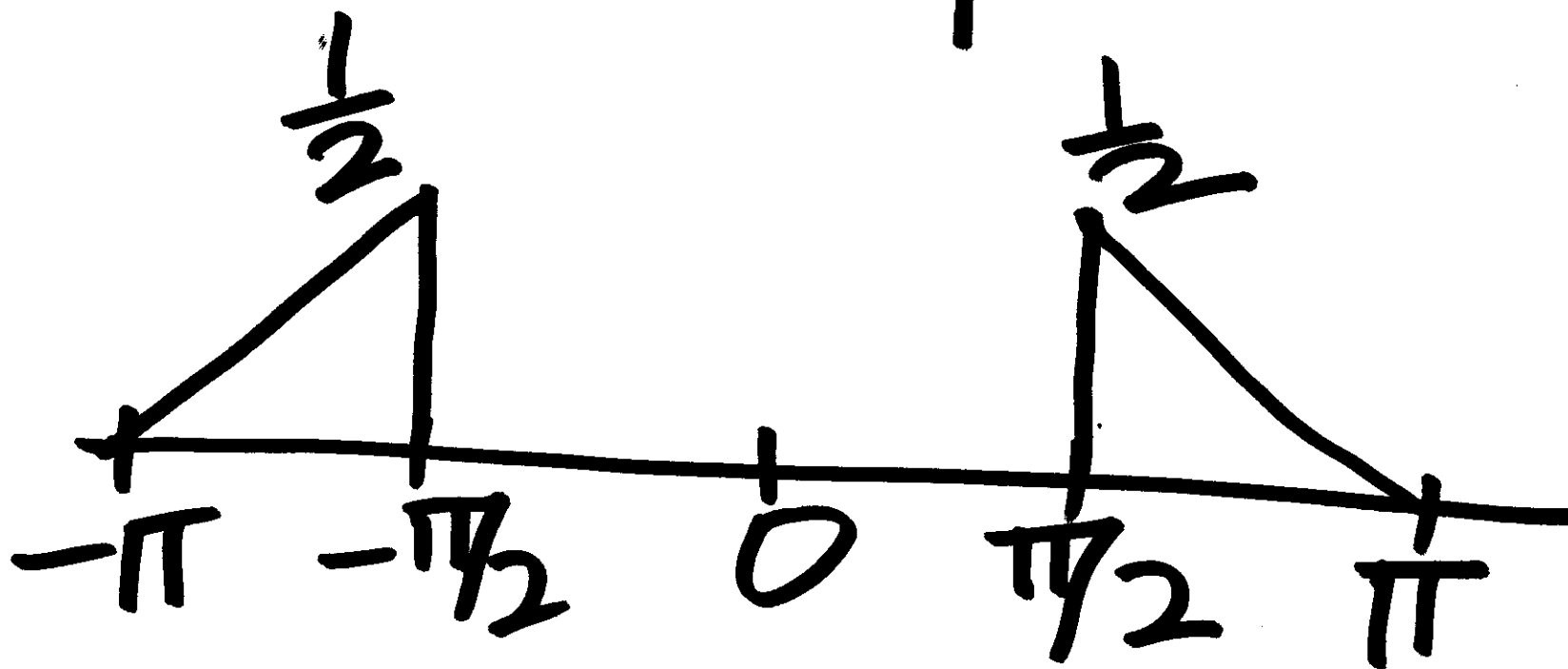




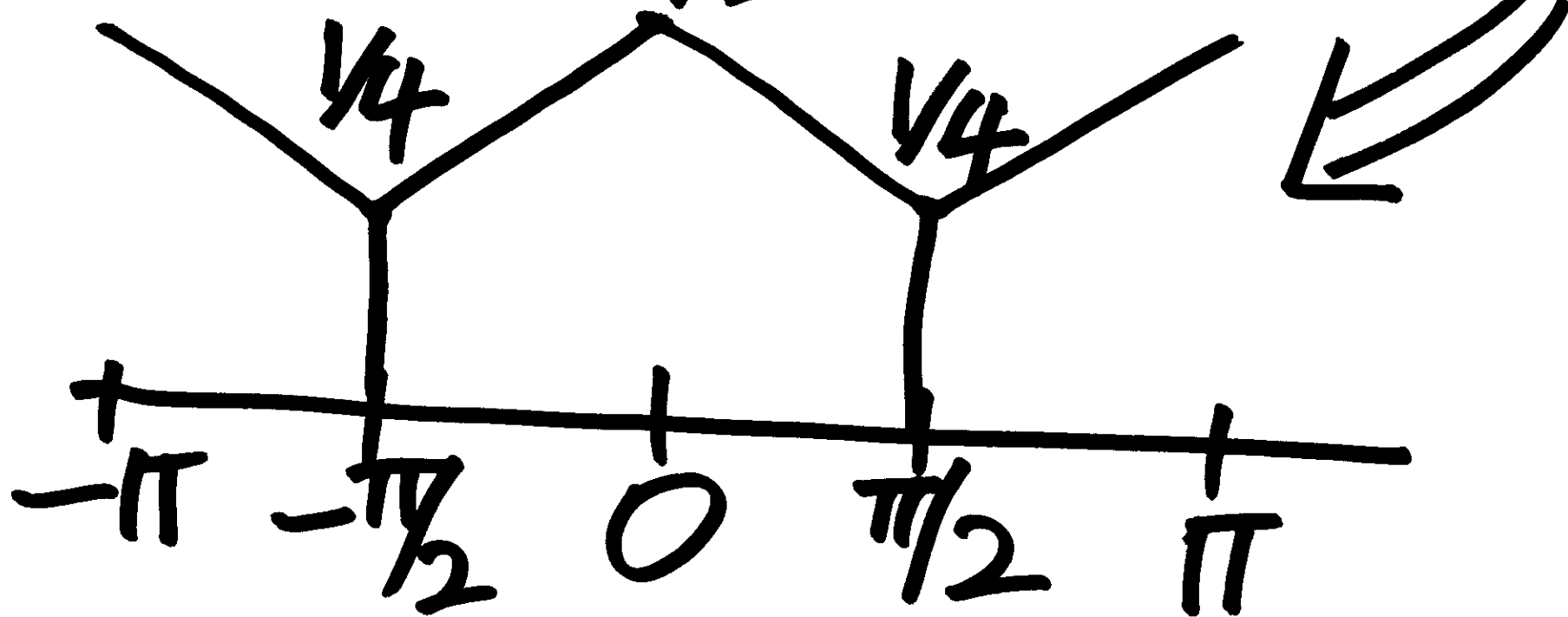
Frequency responses:
IAL and IAH are
respectively ideal
lowpass, highpass
filters, cutoff $\pi/2$



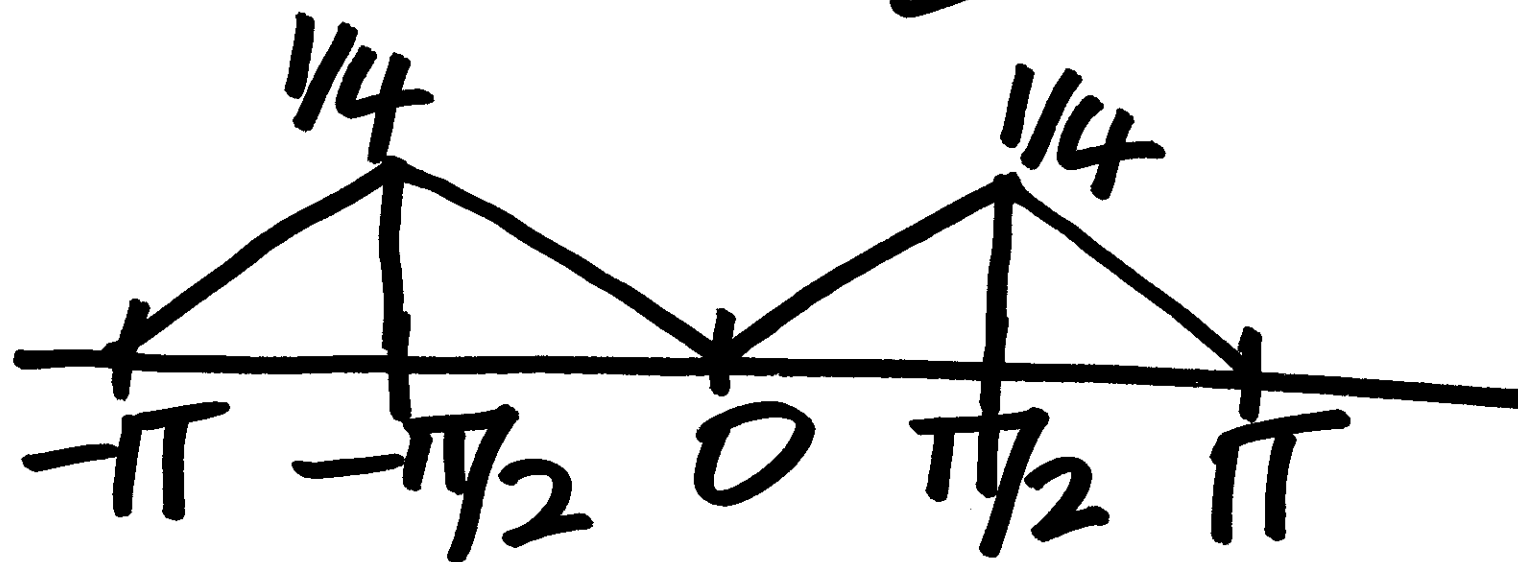
X_2 spectrum

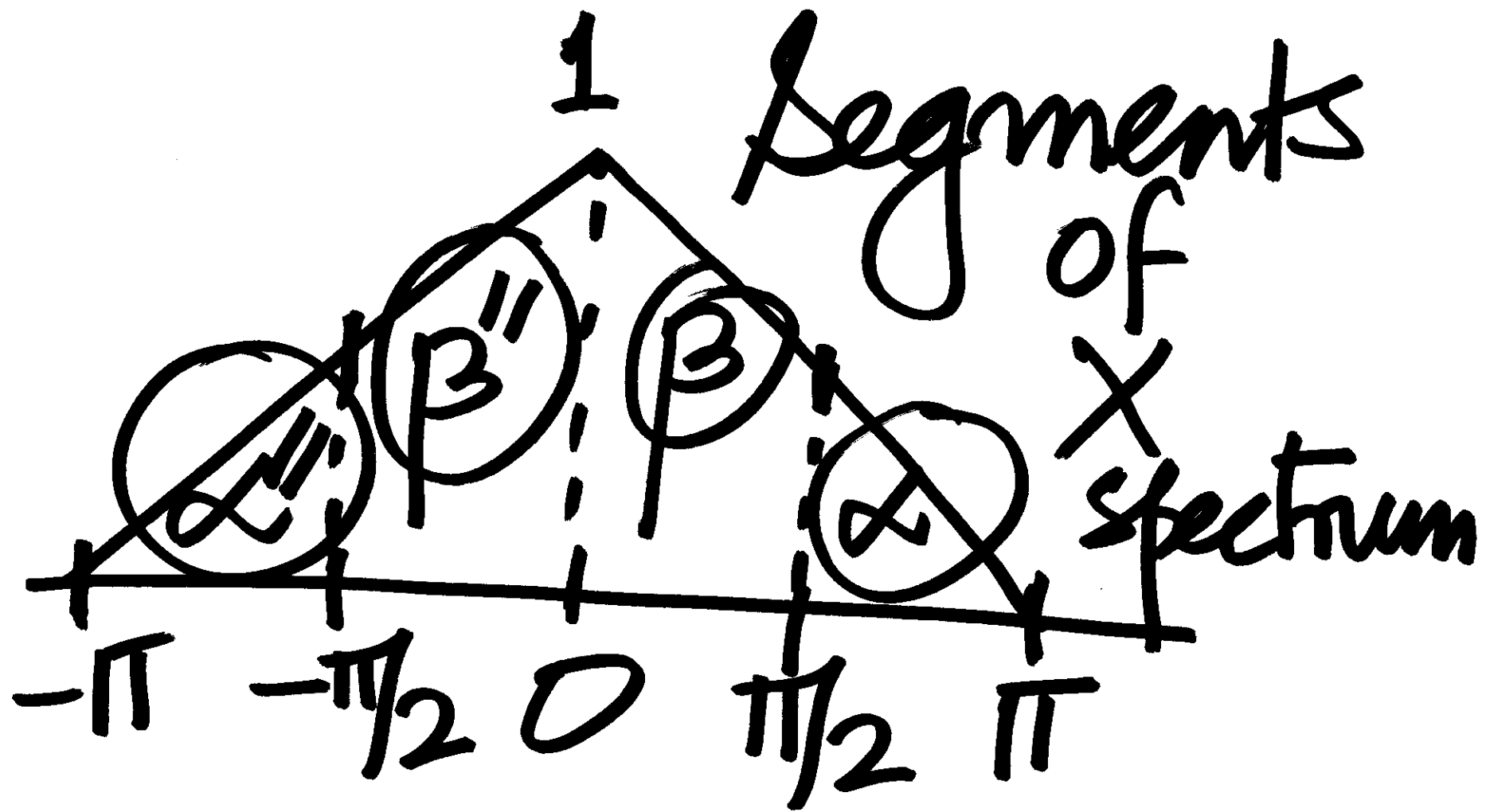


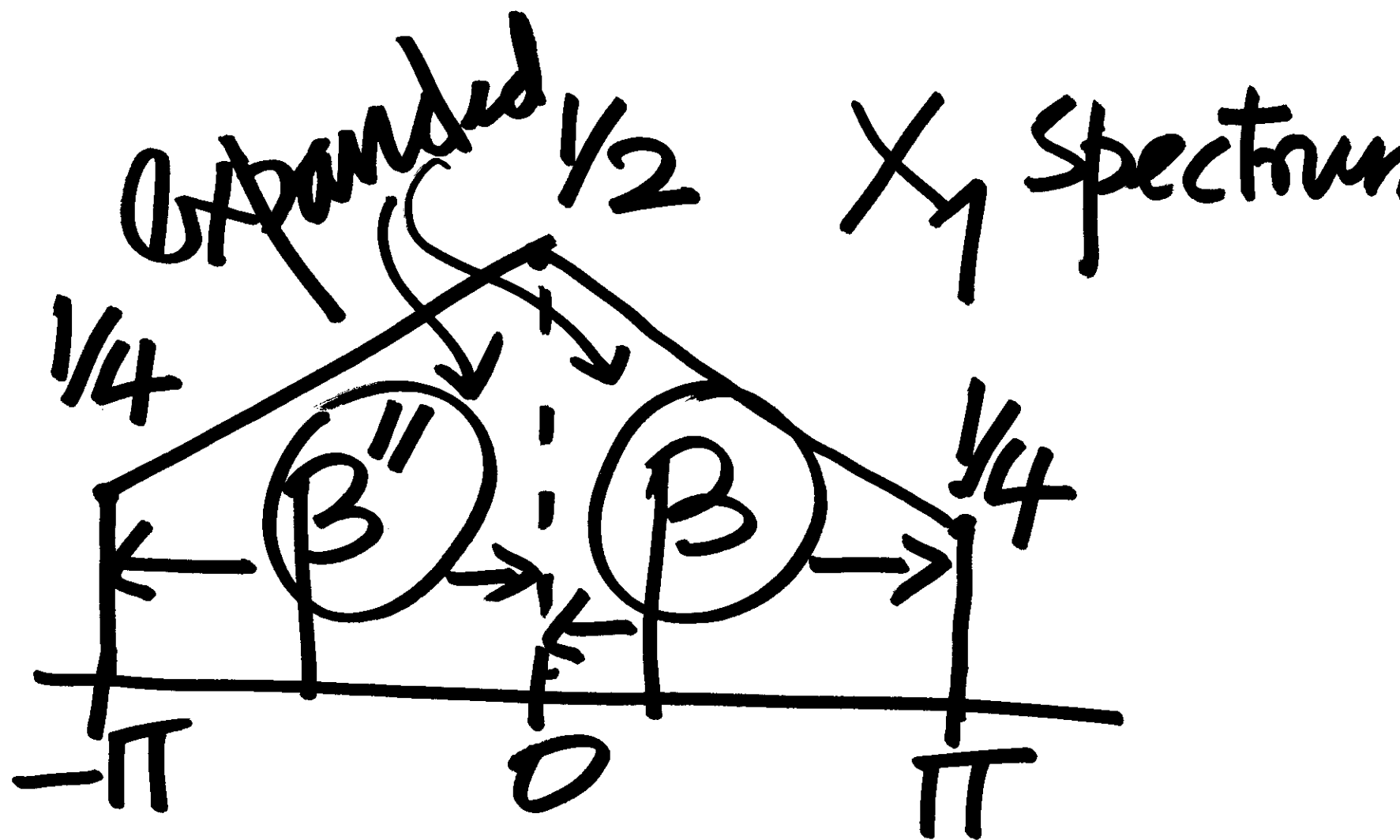
Spectrum of $X_1 \Rightarrow \textcircled{\uparrow 2} \Rightarrow$

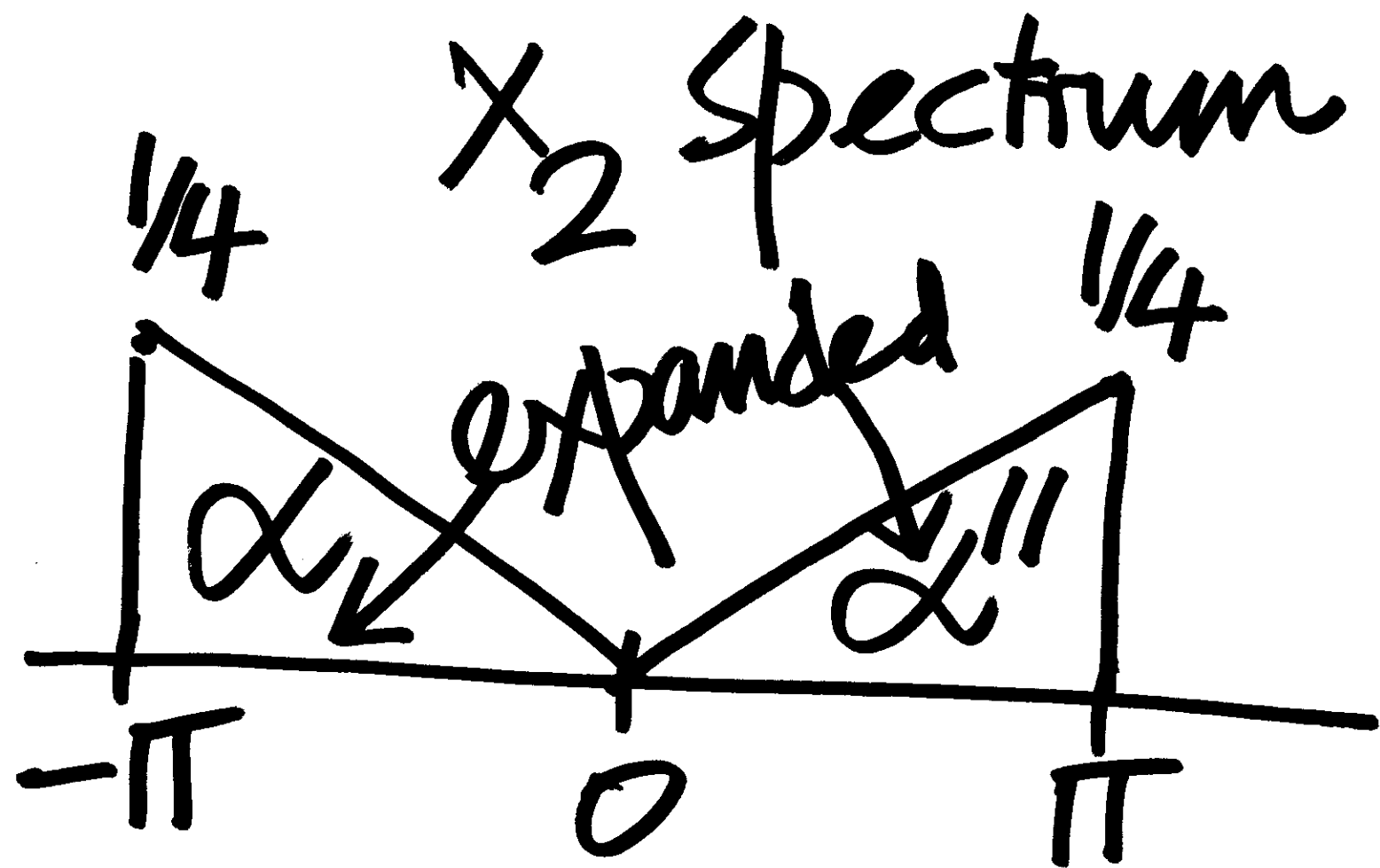


$x_2 \rightarrow \textcircled{\uparrow 2} \rightarrow \text{Spectrum}$









$$X: \pi/2 \rightarrow \pi$$

$$X_2: \pi \rightarrow 0$$

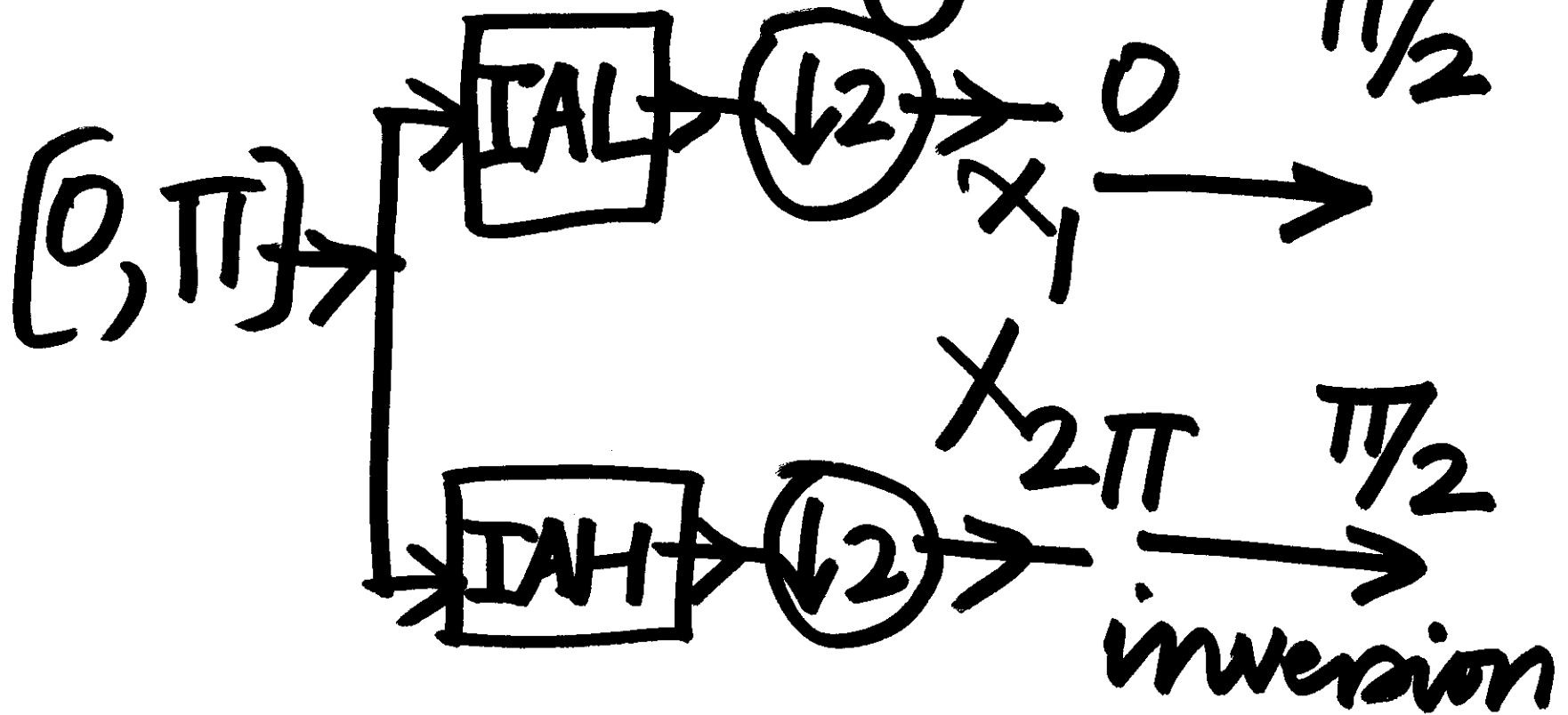
frequency inversion

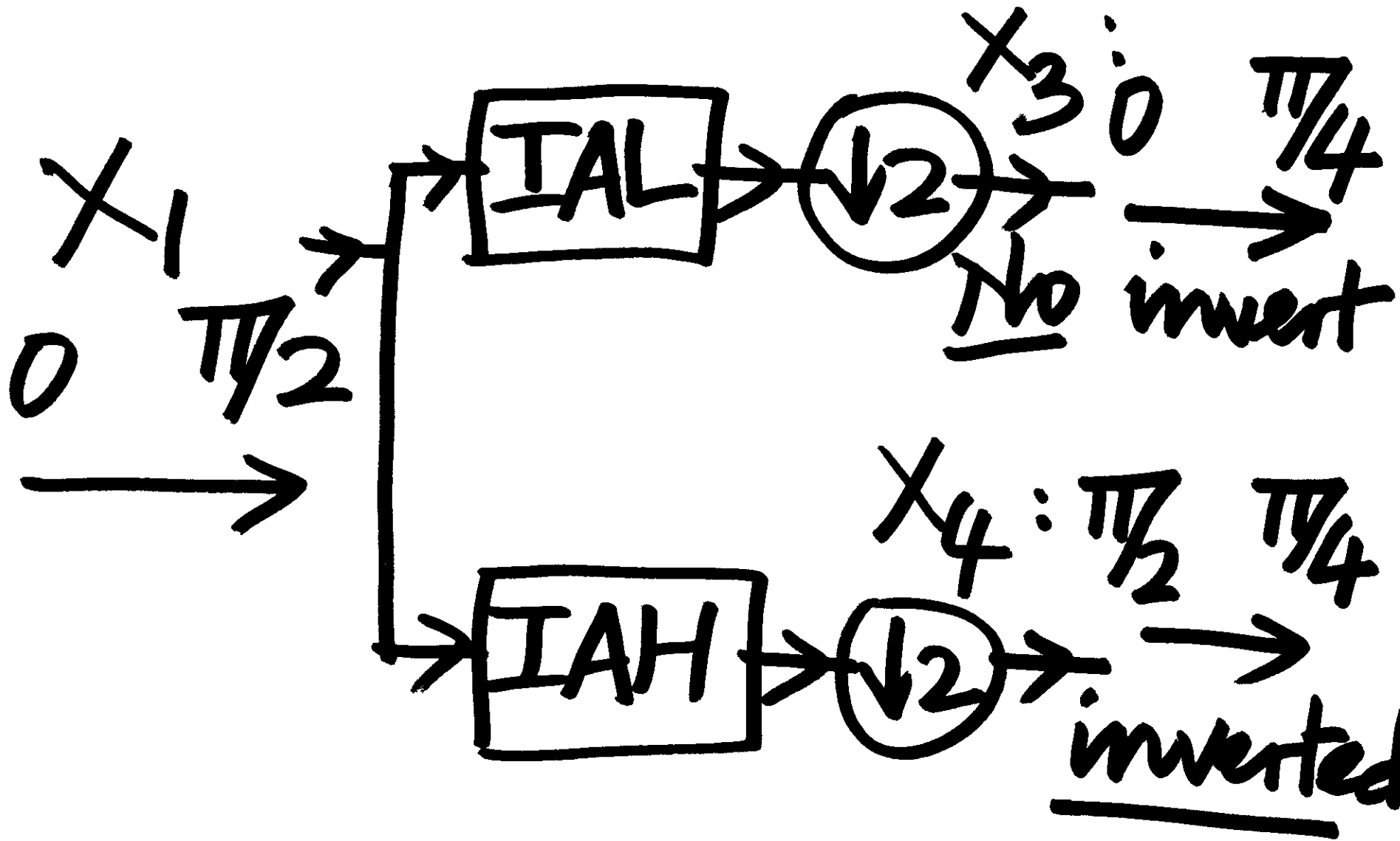
$$X: 0 \rightarrow \pi/2$$

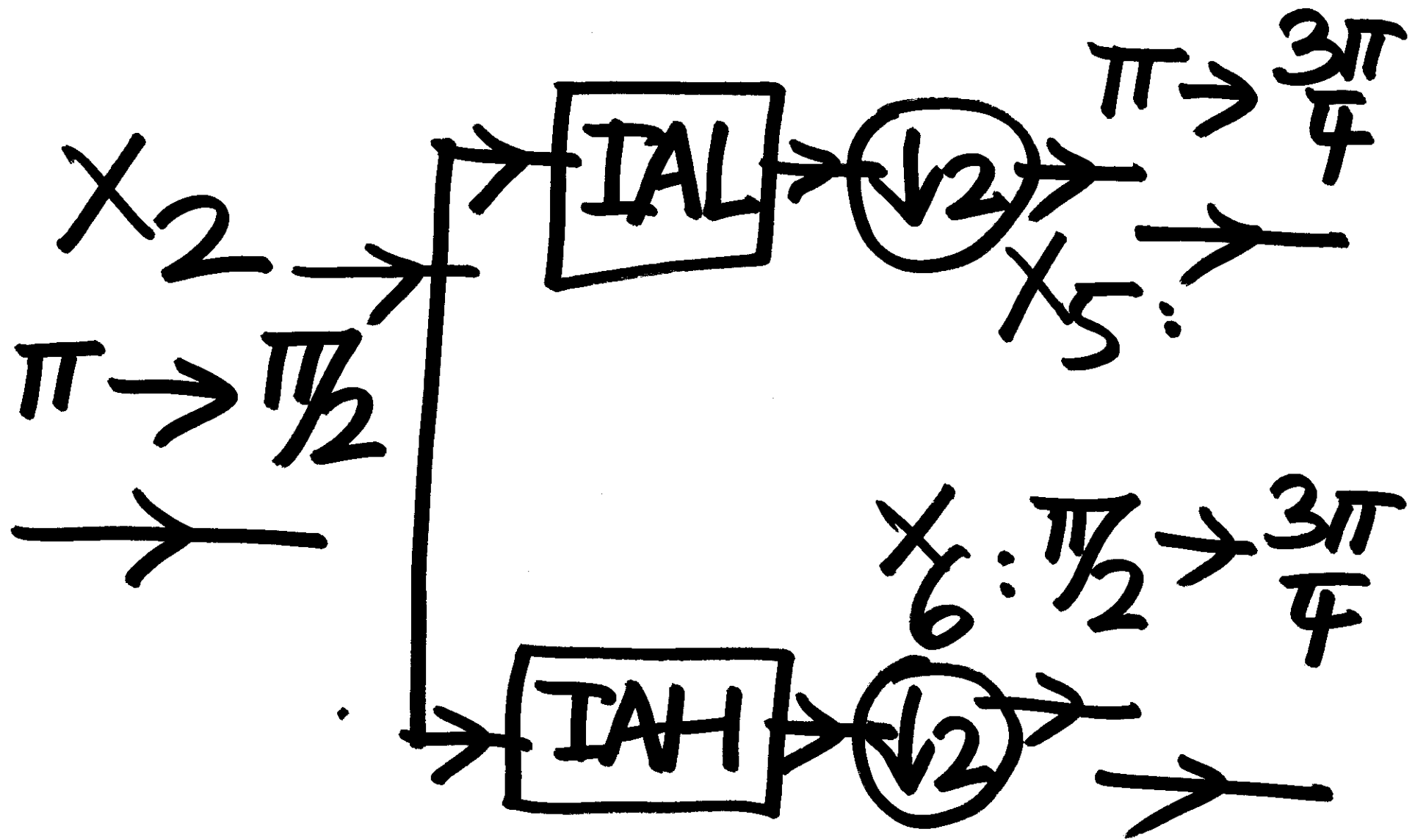
$$X: 0 \rightarrow \pi$$

no frequency inversion

Motionally: no inversion







$X_3: 0 \rightarrow \pi/4 < \text{Not Inverted}$

$X_4: \pi/2 \rightarrow \pi/4 < \text{Inverted}$

$X_5: \pi \rightarrow 3\pi/4 < \text{Inverted}$

$X_6: \pi/2 \rightarrow 3\pi/4 < \text{Not Inverted}$

