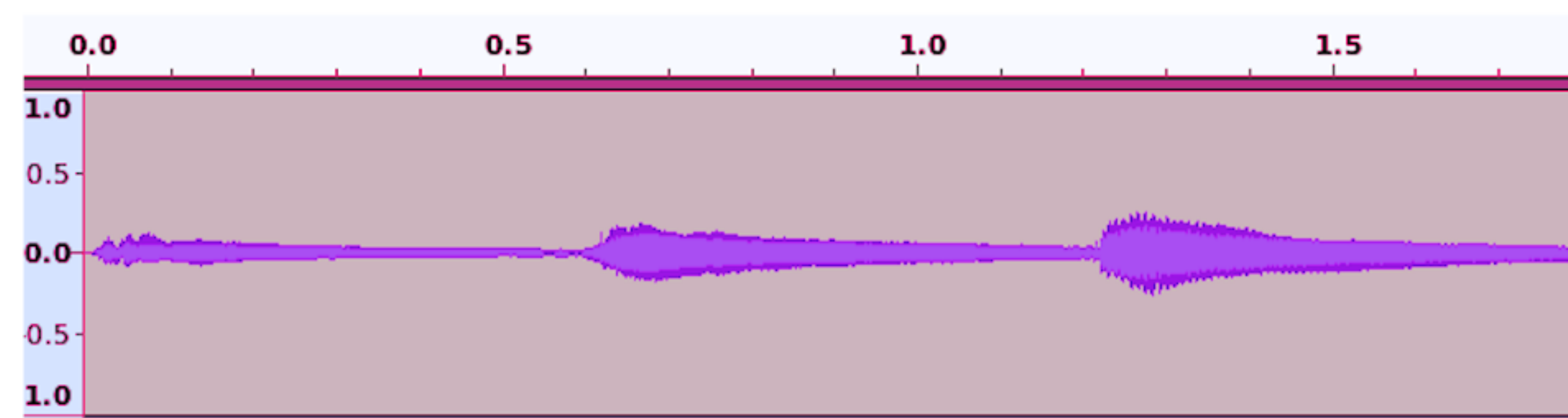


Haoran Wu, Axel Marmoret, Jeremy E. Cohen

Problem

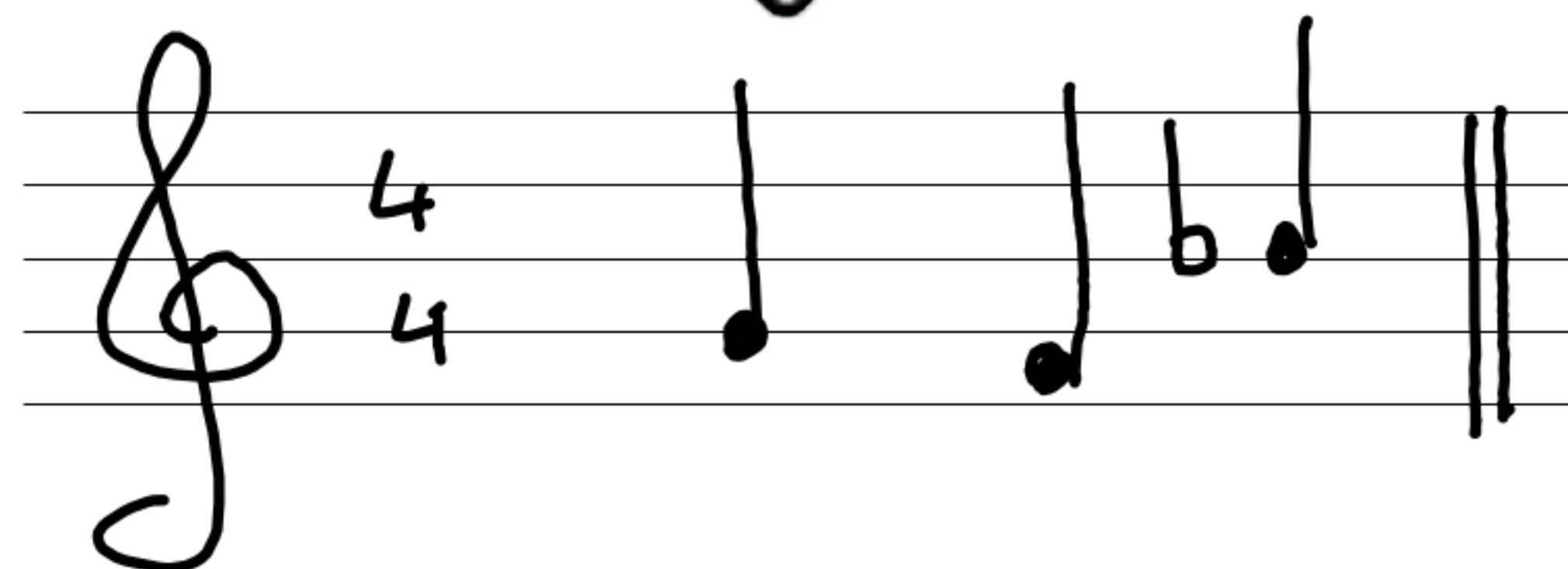


↓ STFT



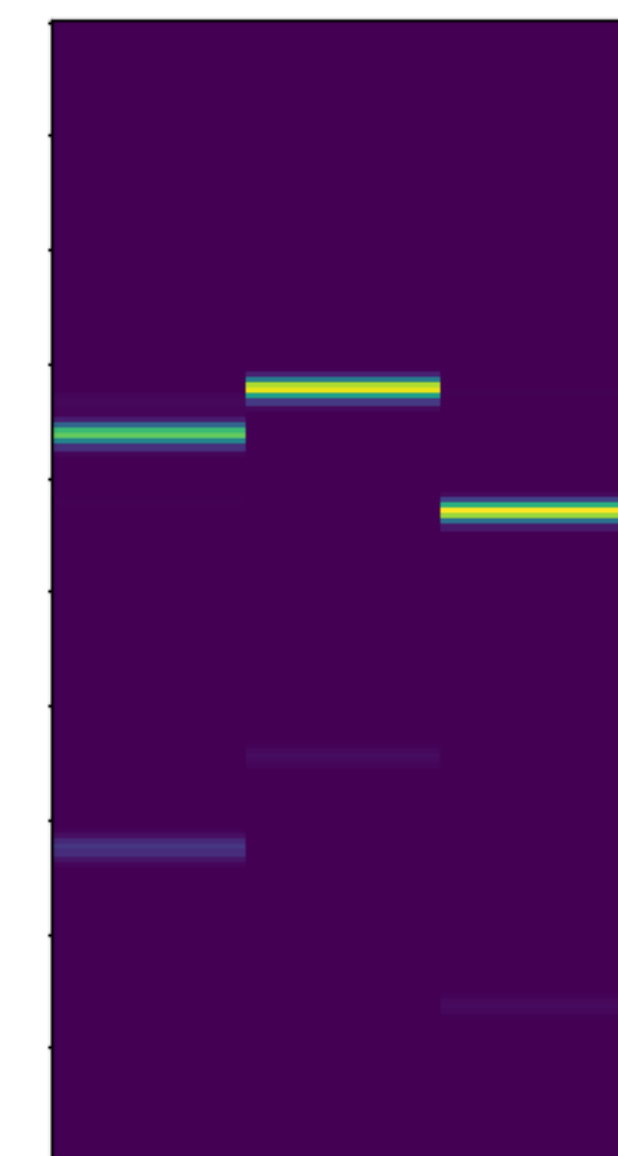
Time

↓

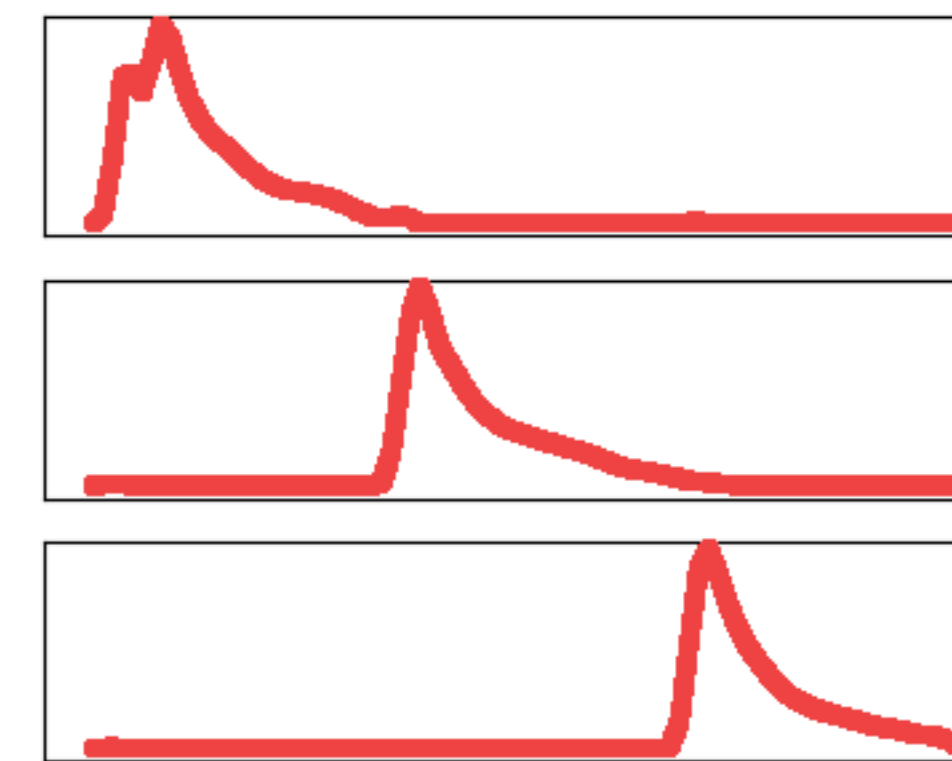


Nonnegative Matrix Factorization

W



H



NMF

Post Processing



NMF is often not unique
W, H may not make sense

Semi-Supervision

1/ Learn W on individual notes

(C4)



Rank1 NMF



w(do)

2/ Learn only H from the song

$$H = \operatorname{argmin}_{H \geq 0} D(X, WH)$$

H nonnegative

(C4)

Rank1 Convolutive NMF



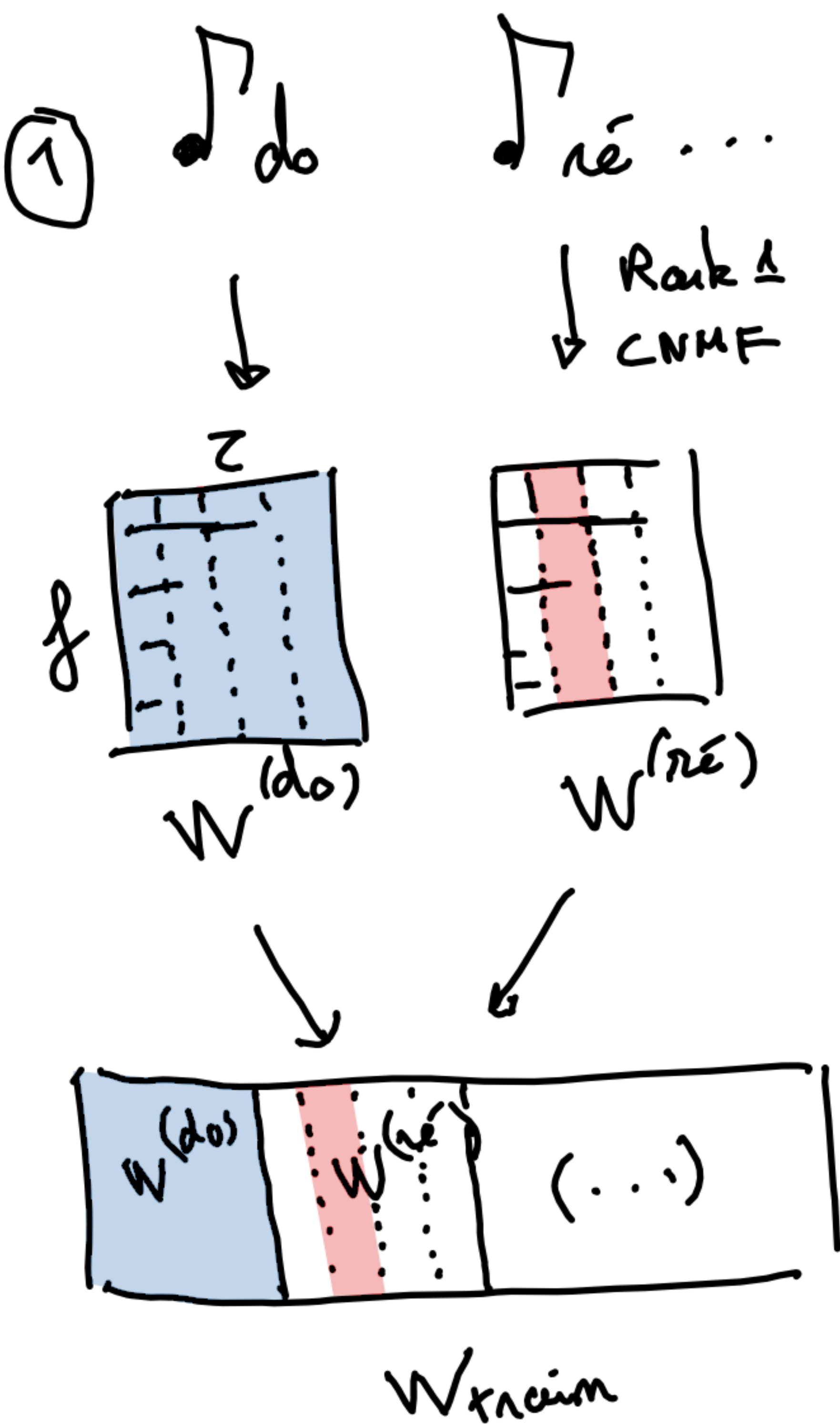
→

W(do)



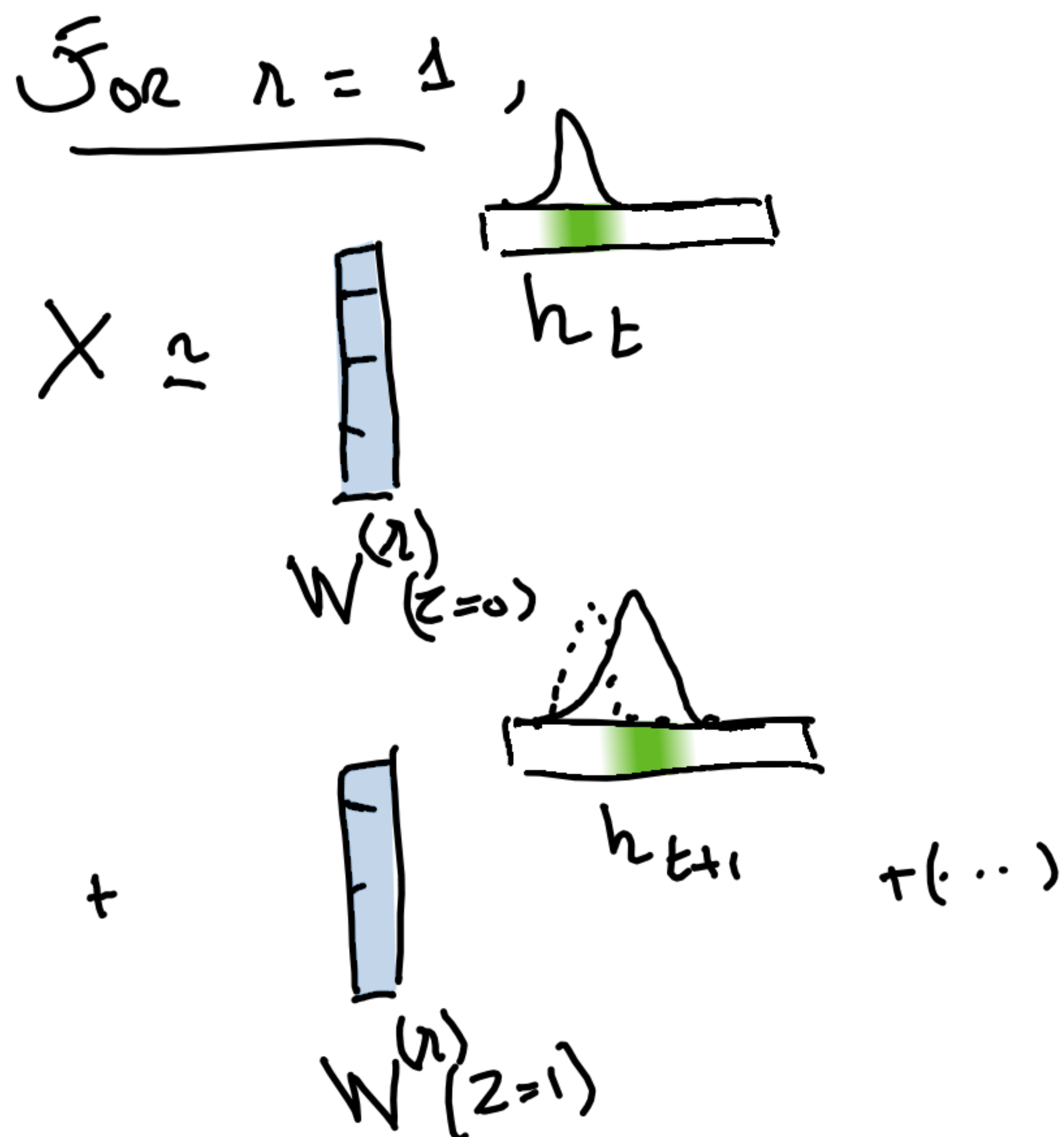
Convolutive NMF for automatic transcription

Principle



CNMF

$$X_{ft} = \sum_{z=0}^{87} W_{fz}^{(z)} h_{t+z}^{(z)}$$



argmin_{W, h} $D_{\beta}(X, W * h)$

is hard even when $r=1$!

Algorithm:

Multiplicative updates
[Fagot 2019]

Results (Preliminary)

Midi notes 55-59



• W :

- Data: MAPS AkPnCGdD
- Comparison with Attack-Decay [Benetos 2016]

F-measure

At. Dec.	0,865
CNMF $\tau=10$	0,908

