

IETF 85

Time-Domain Lapped Transforms for Video Coding

`draft-egge-videocodec-tdlt-00`

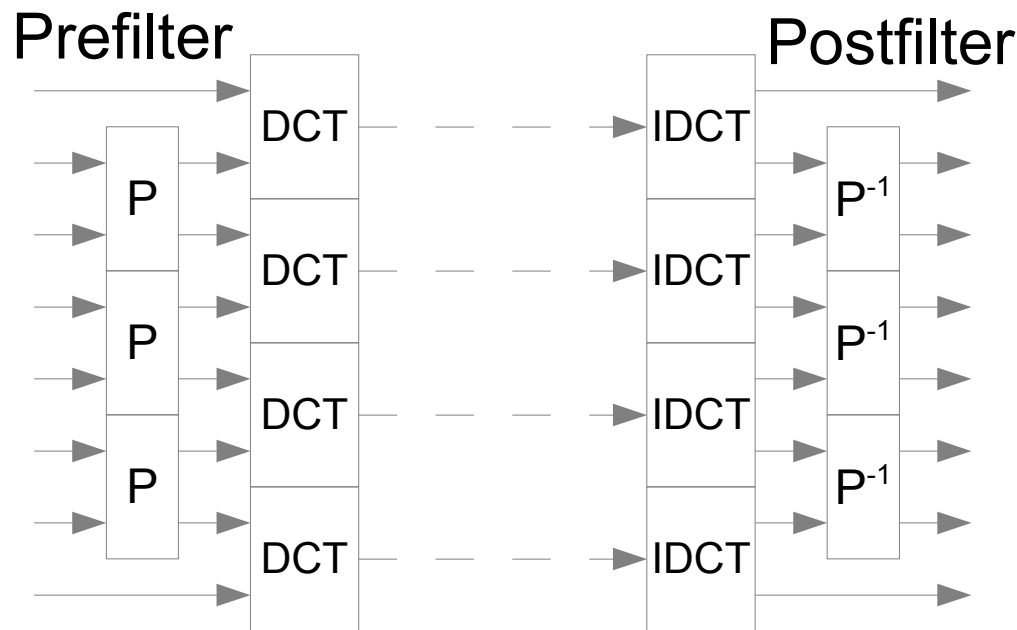
Nathan E. Egge

Motivation

- Structurally eliminate blocking artifacts
- Improve coding gain
 - Both smooth and textured areas

Prefilter and Postfilter

- Apply a *prefilter* in the encoder
 - A linear transform that straddles block edges
 - Removes correlation across edge
- Inverse applied in the decoder



- After prefilter, same structure as traditional codecs

Lapped Transforms: Prefilter

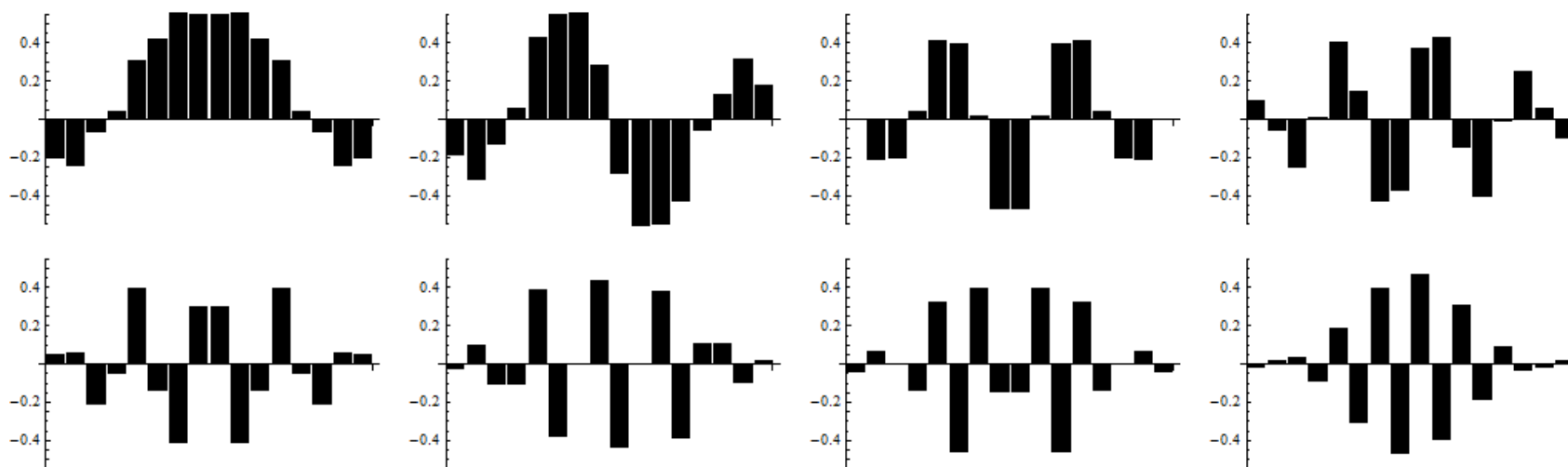
- Prefilter makes things blocky



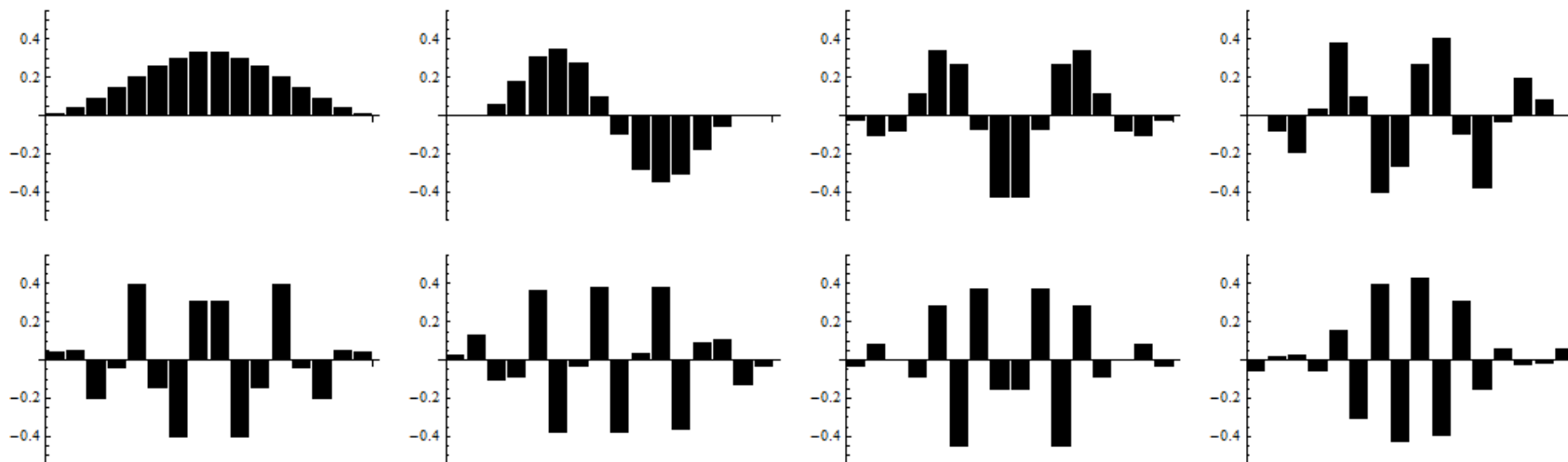
- Postfilter removes blocking artifacts
 - Like loop filter but *invertible*
 - And simpler: no conditional logic to control filter strength

Basis Functions

Analysis Filter

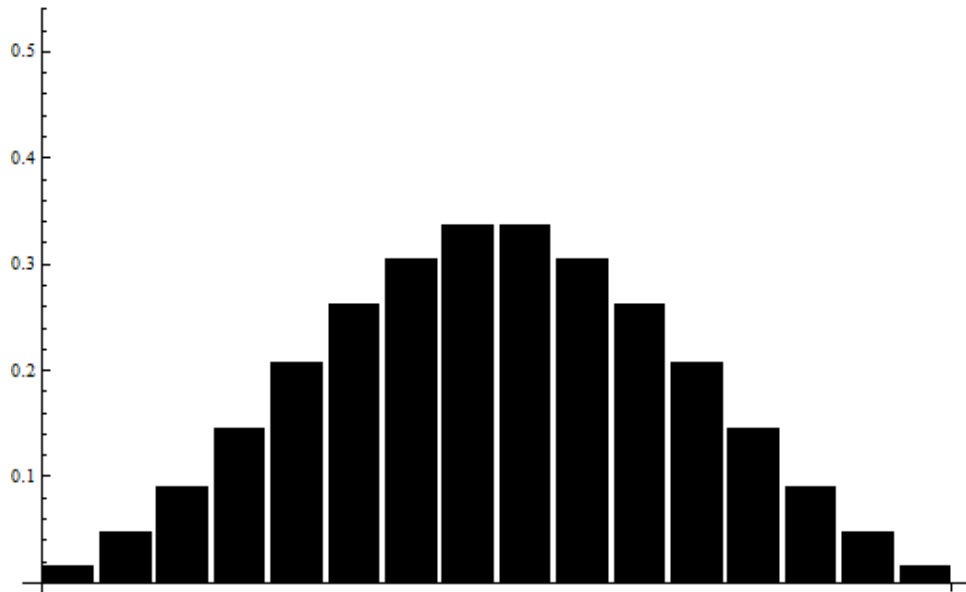


Synthesis Filter

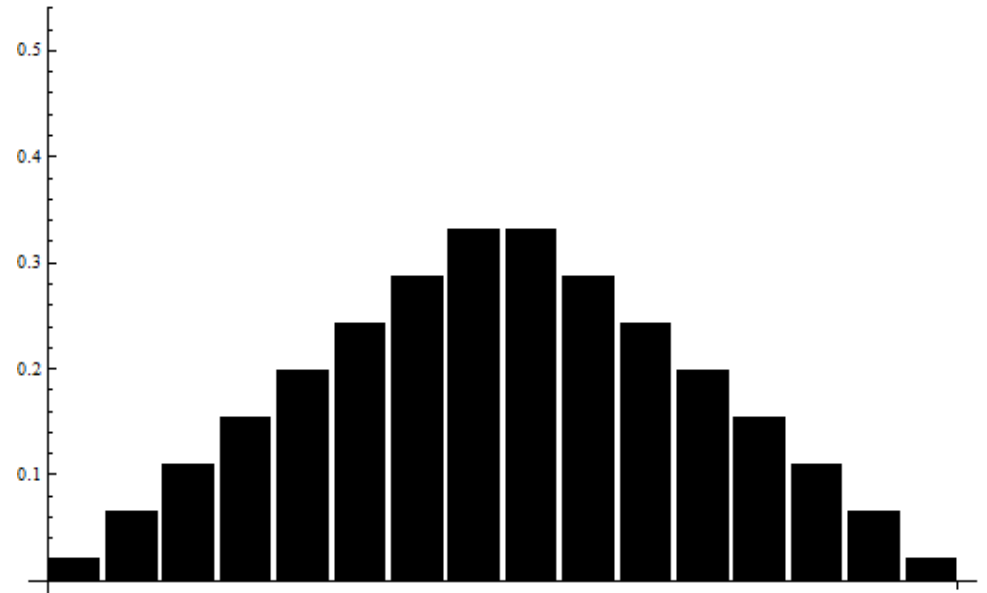


Regularized Transforms

DC Before Regularization



DC After Regularization



- Represents linear gradients with just DC

Coding Gain

	DCT	LT	LT (w/ reg)
4 point	7.5701 dB	8.6349 dB	8.6060 dB
8 point	8.8259 dB	9.6005 dB	9.5687 dB
16 point	9.4555 dB	9.9057 dB	9.8116 dB

Future Work

- Pixels from neighboring blocks not available for intra prediction
- Block matching algorithms must be modified to *not* produce blocking artifacts
 - Overlapped Block Motion Compensation
- Multiple transform sizes