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JVET-C022

Proposed Modifications to the AMT

› Transform Competition in JEM2.0

- AMT (Adaptive Multiple Transforms)

- DCT2 + DCT5 + DCT8
- DST1 + DST7
- provides ≈ 2.8 % gain

Transform Set	Transform Candidates
0	DST-VII, DCT-VIII
1	DST-VII, DST-I
2	DST-VII, DCT-VIII

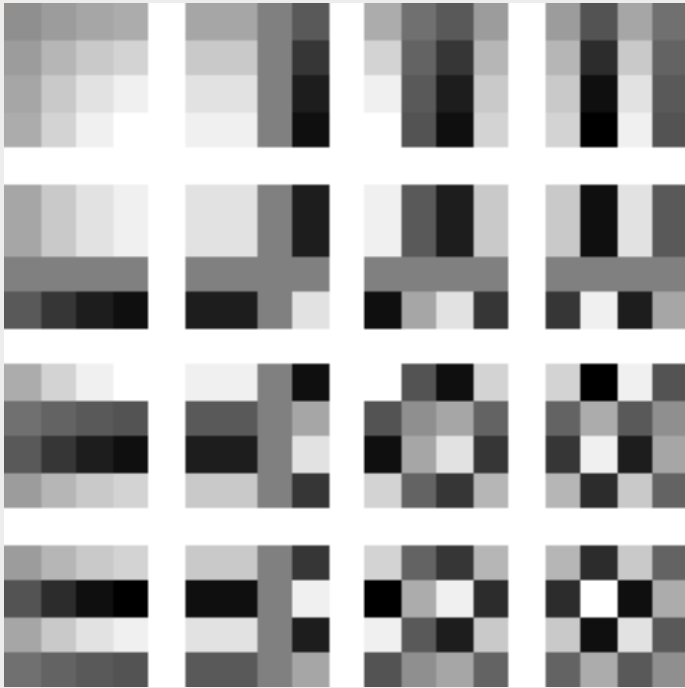
- NSST (Non Separable Secondary Transforms)

- provides ≈ 3.3 %

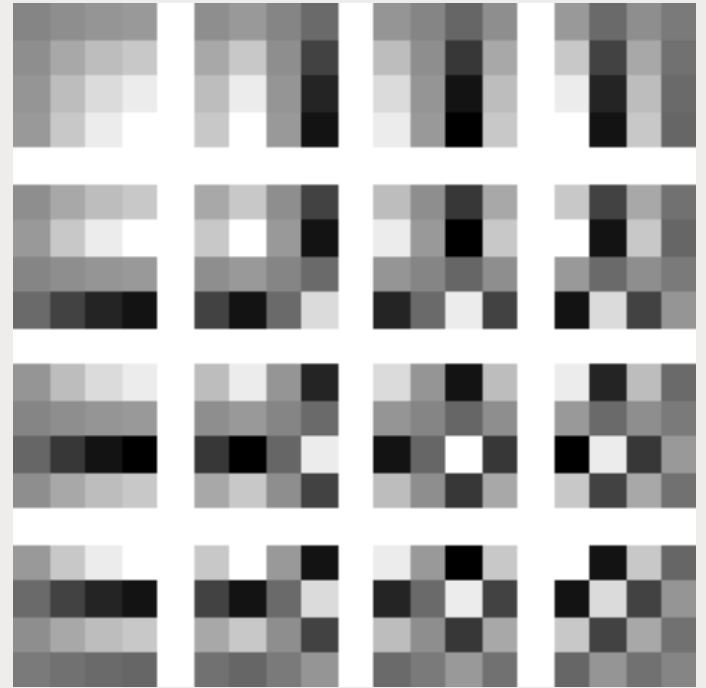
› Proposal: reconsider the AMT transforms set

- › Introduction of two new core transforms
 - DST4
 - fast algorithms exist and widely documented
 - ID (IDentity)
 - one over the vertical and horizontal transform is skipped.
 - A few dozens of code lines added

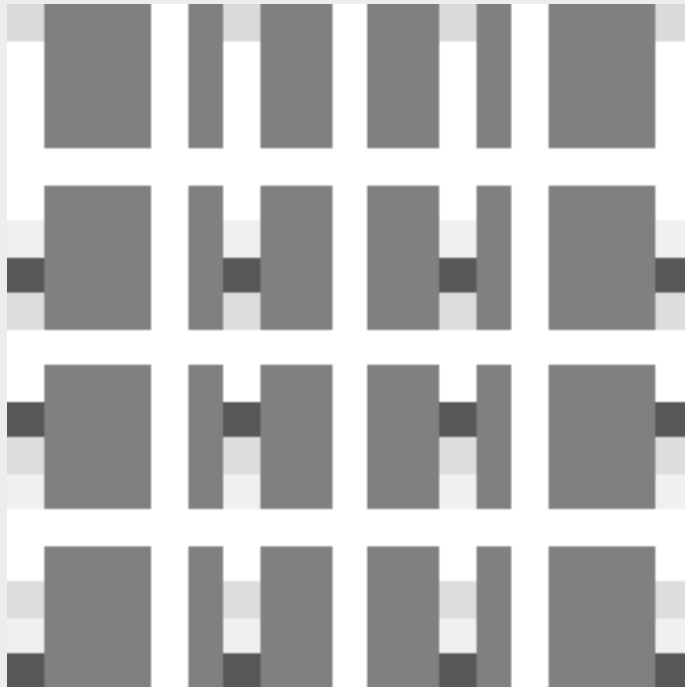
- › Redistribution of the core transforms
 - per prediction mode and block size
 - g_aucTrSetVert and g_aucTrSetHorz tables are replaced



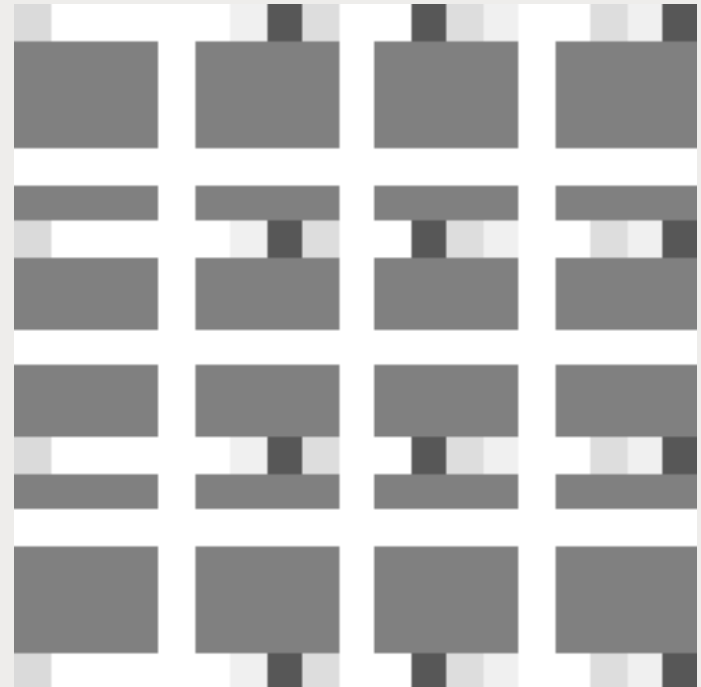
DST VII



DST IV



DCT V + ID



ID + DCT V

All Intra Main10

	CuT vs JEM2			EncT	DecT
	Y	U	V		
Class A1	-0.15%	-0.20%	-0.06%	102%	101%
Class A2	-0.31%	0.01%	0.02%	102%	101%
Class B	-0.33%	-0.28%	-0.21%	101%	100%
Class C	-0.45%	-0.19%	-0.18%	100%	101%
Class D	-0.48%	-0.29%	-0.23%	99%	100%
Class E	-0.53%	-0.31%	-0.34%	102%	100%
Overall	-0.37%	-0.21%	-0.16%	101%	101%
Class F (optional)	-1.32%	-0.54%	-0.51%	100%	100%

Random Access Main 10

	CuT vs JEM2			EncT	DecT
	Y	U	V		
Class A1	-0.10%	0.20%	-0.02%	99%	98%
Class A2	-0.39%	-0.17%	-0.03%	100%	100%
Class B	-0.17%	0.19%	0.11%	100%	102%
Class C	-0.24%	0.04%	-0.07%	99%	101%
Class D	-0.25%	-0.21%	-0.27%	100%	100%
Class E					
Overall (Ref)	-0.23%	0.02%	-0.05%	100%	100%
Class F (optional)	-1.32%	-0.54%	-0.51%		

	Low Delay B over JEM2			EncT	DecT
	Y	U	V		
Class A1					
Class A2					
Class B	-0.04%	-0.14%	0.12%	98%	99%
Class C	-0.11%	0.02%	-0.24%	97%	98%
Class D	-0.02%	-0.90%	-0.55%	99%	100%
Class E	-0.14%	-0.23%	-0.65%	97%	98%
Overall (Ref)	-0.07%	-0.31%	-0.28%	98%	99%
Class F (optional)	-0.67%	0.07%	-0.32%	98%	98%

	Low Delay P over JEM2			EncT	DecT
	Y	U	V		
Class A1					
Class A2					
Class B	-0.04%	-0.04%	-0.27%	98%	98%
Class C	-0.08%	-0.14%	-0.15%	97%	98%
Class D	-0.11%	-0.29%	0.48%	98%	97%
Class E	-0.05%	-0.27%	-0.60%	97%	97%
Overall (Ref)	-0.07%	-0.17%	-0.11%	98%	97%
Class F (optional)	-0.63%	0.08%	-0.17%	98%	99%

- › Small changes
 - Table re-factorisation
 - Additional core transforms with known and efficient implementations
- › Provide consistent improvement
 - 0.37% AI and 0.23% RA
 - No impact on the encoding / decoding run times
- › Proposed for integration
- › *Thanks to Samsung for the cross-check (C0051)*

Merci / Thanks

	AMT	AMT+ID	AMT+ID+DST4
A	-0.21	-0.16	-0.22
B	-0.17	-0.25	-0.33
C	-0.16	-0.30	-0.56
D	-0.16	-0.37	-0.50
E	-0.13	-0.35	-0.56
F	-0.24	-0.89	-1.28
A,B,C,D,E	-0.17	-0.26	-0.39

Merci / Thanks