

draft-valin-netvc-11tw-01

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Introduction

- Early work towards improving screencasting
- Implemented in Daala, but easily applicable to other codecs

Screencasting Properties

- Anti-aliased text on flat background
- Many horizontal lines and edges
- Reduced number of colours
- Simple “window” displacements
- ...
- What else? Suggestions welcome

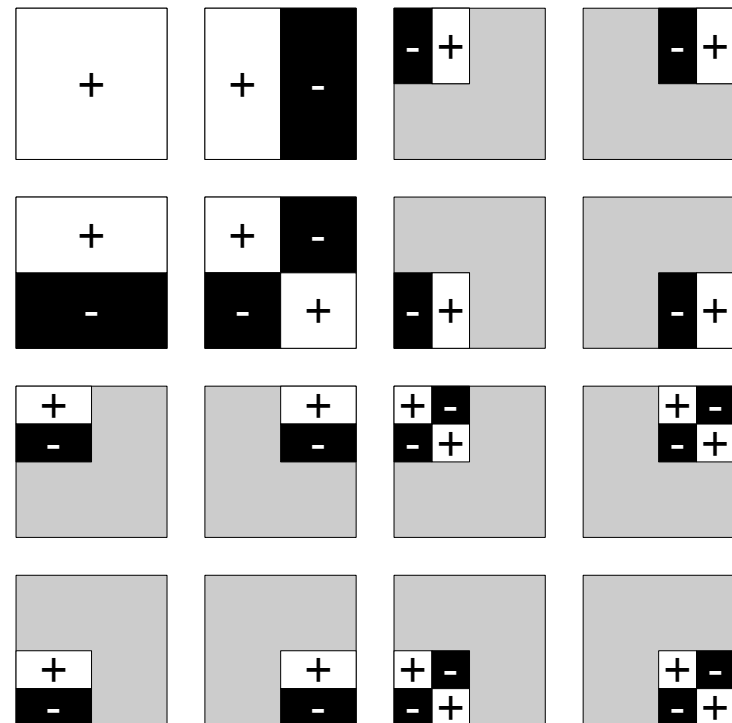
Haar Wavelet

- Simplest orthogonal wavelet
 - Good on synthetic content, bad on natural images

$N = 2, 1\text{-D}$

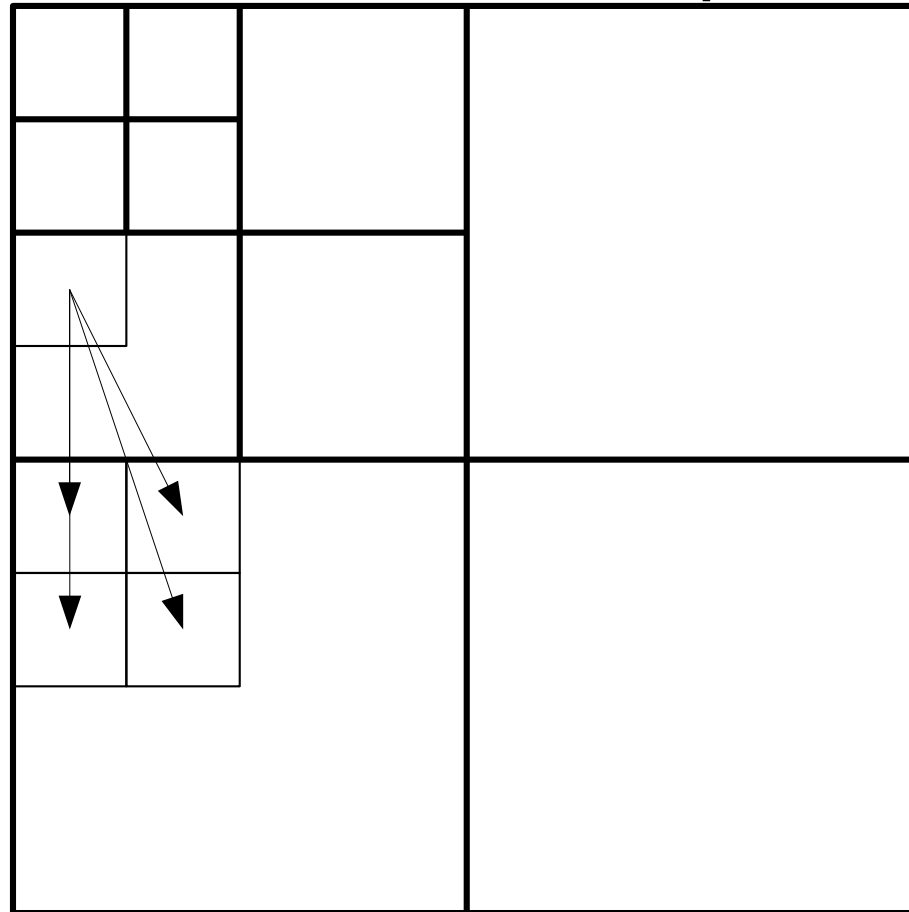
$$\mathbf{y} = \sqrt{\frac{1}{2}} \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \mathbf{x}$$

$N = 4, 2\text{-D}$

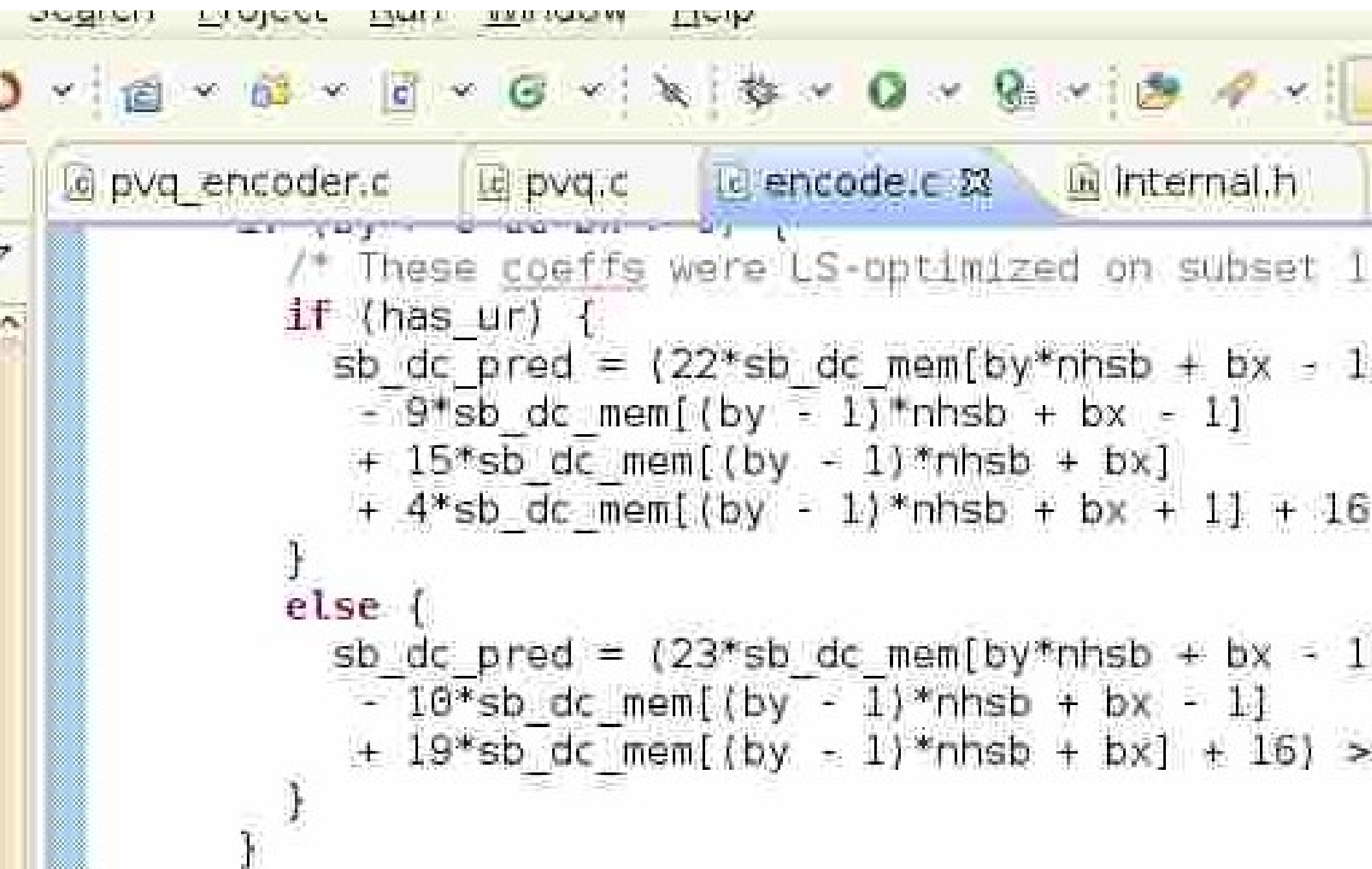


L1-Tree Wavelet Encoding

- Based on the sum of absolute values in trees
- Encode distribution between parent and children

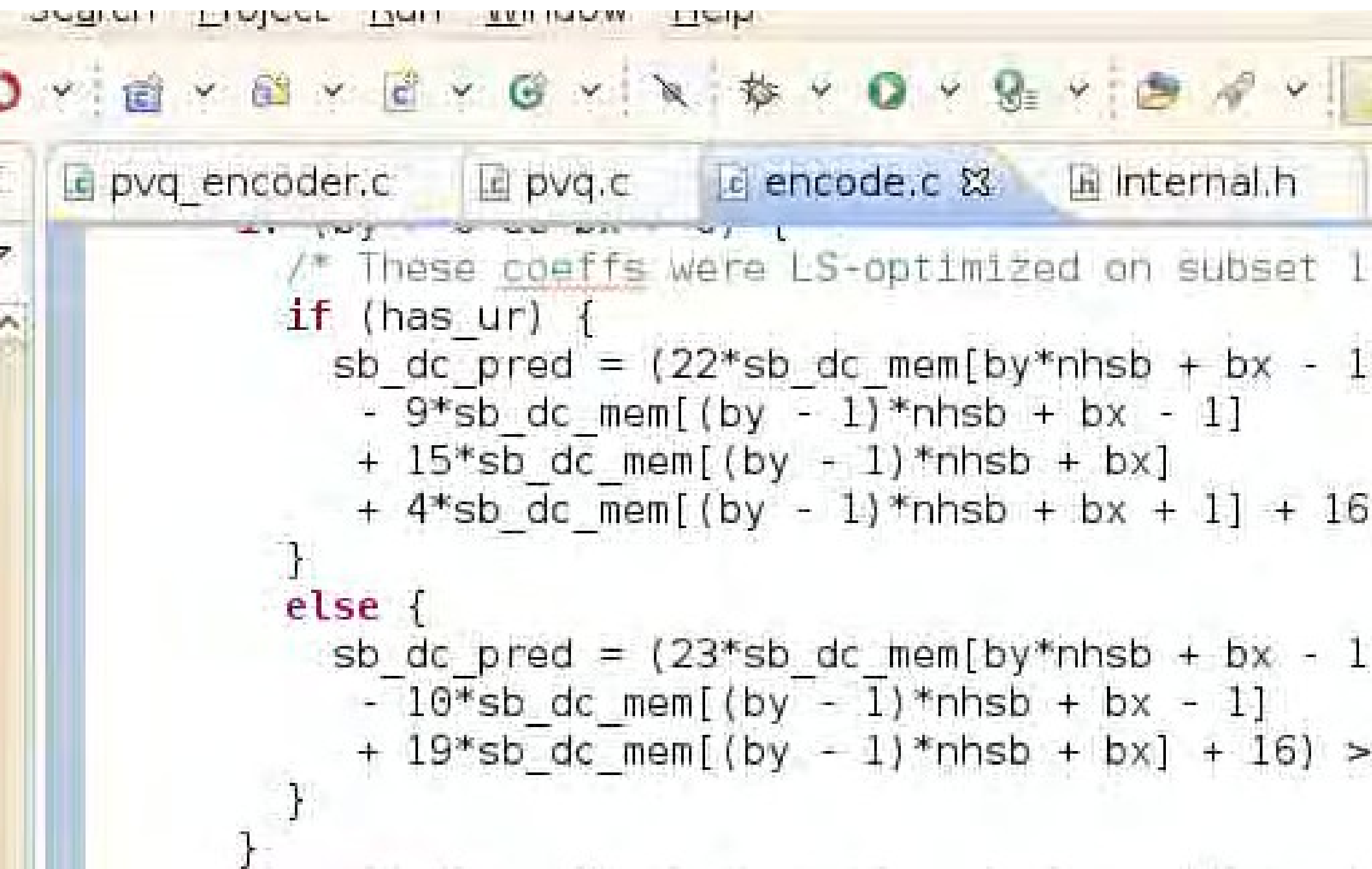


Results (JPEG)



```
Project  Project  Build  Run  Debug  Help
File  Edit  View  Tools  Windows  Help
@ pvq_encoder.c  @ pvq.c  @ encode.c  @ internal.h
/* These coeffs were LS-optimized on subset 1
if (has_ur) {
    sb_dc_pred = (22*sb_dc_mem[by*nhsb + bx - 1]
        - 9*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 15*sb_dc_mem[(by - 1)*nhsb + bx]
        + 4*sb_dc_mem[(by - 1)*nhsb + bx + 1] + 16) >
}
else {
    sb_dc_pred = (23*sb_dc_mem[by*nhsb + bx - 1]
        - 10*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 19*sb_dc_mem[(by - 1)*nhsb + bx] + 16) >
}
}
```

Results (Lapped DCT)



The image shows a screenshot of a code editor window with several tabs open: 'pvq_encoder.c', 'pvq.c', 'encode.c', and 'Internal.h'. The 'encode.c' tab is active and displays the following C code snippet:

```
/* These coeffs were LS-optimized on subset 1
if (has_ur) {
    sb_dc_pred = (22*sb_dc_mem[by*nhsb + bx - 1]
        - 9*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 15*sb_dc_mem[(by - 1)*nhsb + bx]
        + 4*sb_dc_mem[(by - 1)*nhsb + bx + 1] + 16) >
}
else {
    sb_dc_pred = (23*sb_dc_mem[by*nhsb + bx - 1]
        - 10*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 19*sb_dc_mem[(by - 1)*nhsb + bx] + 16) >
}
}
```

Results (Haar)

Search Project Build Window Help

pvq_encoder.c pvq.c encode.c internal.h

```
/* These coeffs were LS-optimized on subset 1
if (has_ur) {
    sb_dc_pred = (22*sb_dc_mem[by*nhsb + bx - 1]
        - 9*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 15*sb_dc_mem[(by - 1)*nhsb + bx]
        + 4*sb_dc_mem[(by - 1)*nhsb + bx + 1] + 16) >
}
else {
    sb_dc_pred = (23*sb_dc_mem[by*nhsb + bx - 1]
        - 10*sb_dc_mem[(by - 1)*nhsb + bx - 1]
        + 19*sb_dc_mem[(by - 1)*nhsb + bx] + 16) >
}
}
```


Results (x265)

```
Search Project Run Window Help
[Icons]
[c] pvq_encoder.c | [c] pvq.c | [c] encode.c ✖ | [h] internal.h
/* These coeffs were LS-optimized on subset 1
if (has_ur) {
    sb_dc_pred = (22*sb_dc_mem[by*nhsb + bx - 1
                - 9*sb_dc_mem[(by - 1)*nhsb + bx - 1]
                + 15*sb_dc_mem[(by - 1)*nhsb + bx]
                + 4*sb_dc_mem[(by - 1)*nhsb + bx + 1] + 16
    }
else {
    sb_dc_pred = (23*sb_dc_mem[by*nhsb + bx - 1
                - 10*sb_dc_mem[(by - 1)*nhsb + bx - 1]
                + 19*sb_dc_mem[(by - 1)*nhsb + bx] + 16) >
    }
}
```

Objective Evaluation

- Added *screenshots* set to *Are We Compressed Yet? Website*
- PSNR, PSNR-HVS, SSIM, FAST-SSIM results
 - Not clear which metrics (if any) are correct
 - So far, PSNR-HVS appeared to be the least wrong

Questions?