

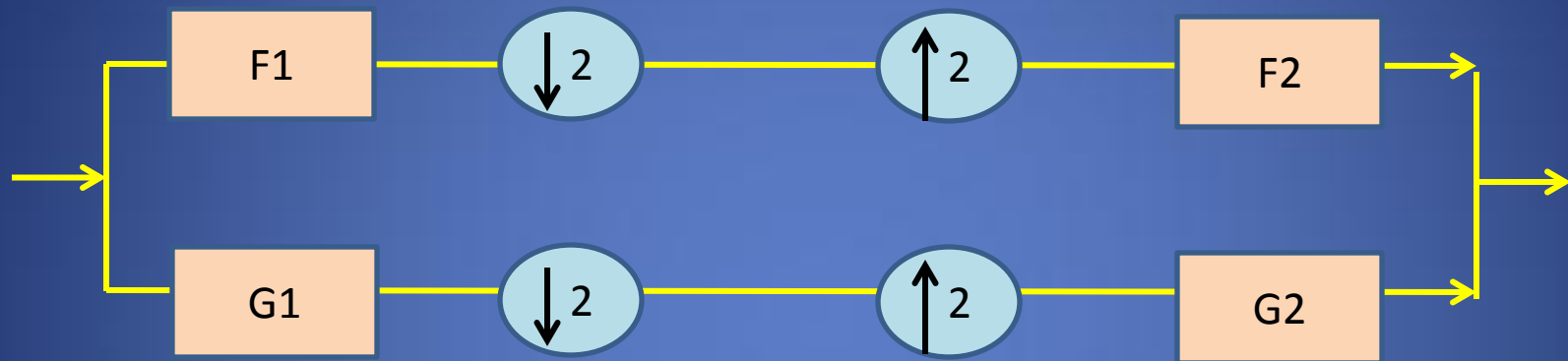


FastVDO
like it's meant to be...

JCT2-A0155: Sampling Filters for Depth Map Video for 3DV (CE3 Related)

Dr. Pankaj Topiwala
FastVDO Inc.

2-Ch Perf Recon Filter Bank (PRFB)



- 2 Ch Perfect Recon Filter Banks
 - 1980s - Smart co-design of filters allow alias cancelation
 - 1990s – discover lifting based approaches
 - 2000 – JPEG2000

Sampling = 1-Ch FB. PR?



- Sampling (down and up) is a 1-Ch FB
 - Perf Recon is no longer possible
 - But we can still cancel some aliasing!
 - Related to Laplace Pyramid; have lifting interpretation
- Moral: can do better than half-band filters

Standard Half-Band Filters (SVC)

- Down

- $\text{svc13} = [2 \ 0 \ -4 \ -3 \ 5 \ 19 \ 26 \ 19 \ 5 \ -3 \ -4 \ 0 \ 2] / 64$

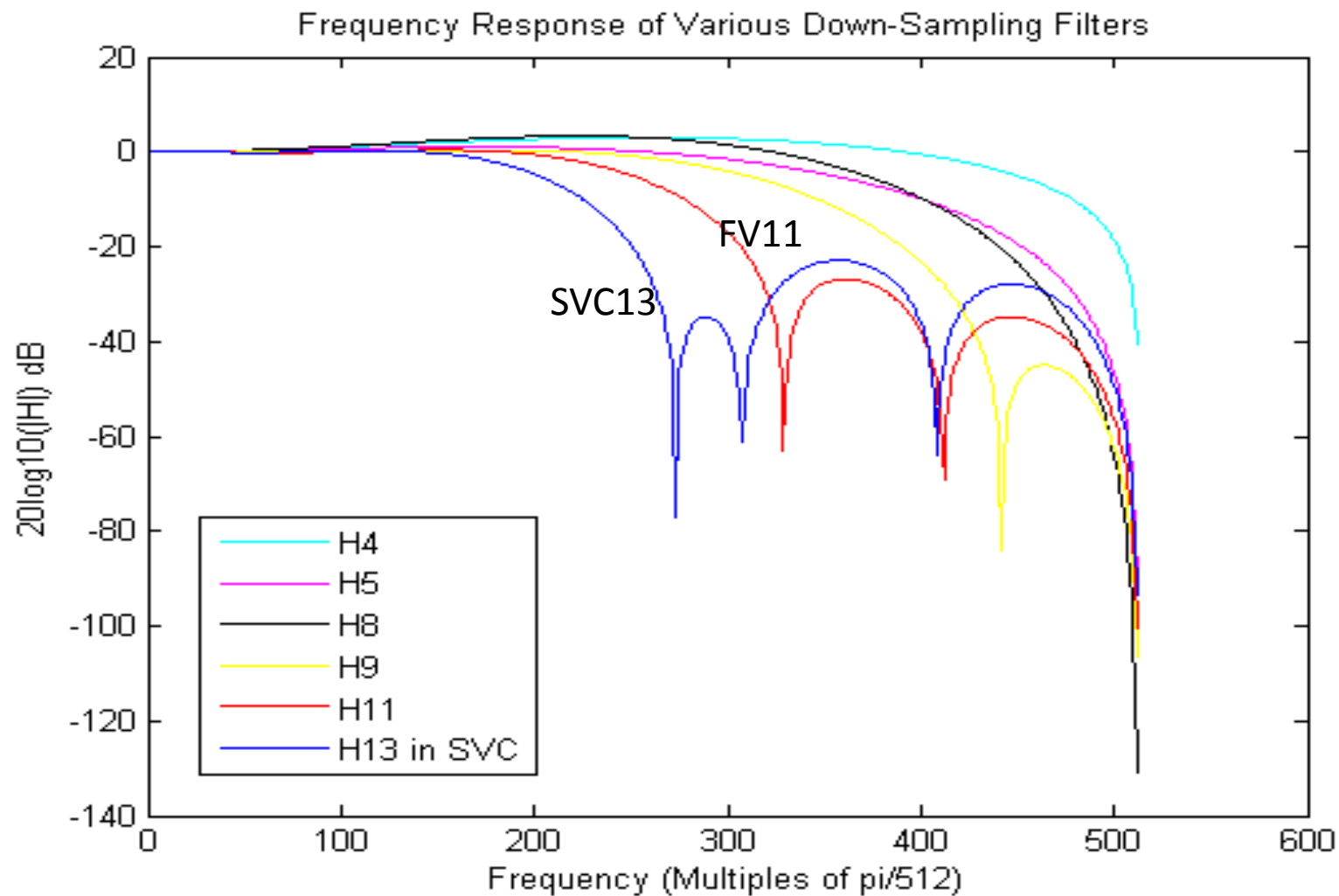
- Up

- $\text{Svc4} = [-3 \ 19 \ 19 \ -3] / 32$

FastVDO Anti-Alias Filters

- Down
 - $\mathbf{fv11} = [1 \ 0 \ -3 \ 0 \ 10 \ 16 \ 10 \ 0 \ -3 \ 0 \ 1] / 32$
- Up
 - $\mathbf{fv4} = [-1 \ 5 \ 5 \ -1] / 8$

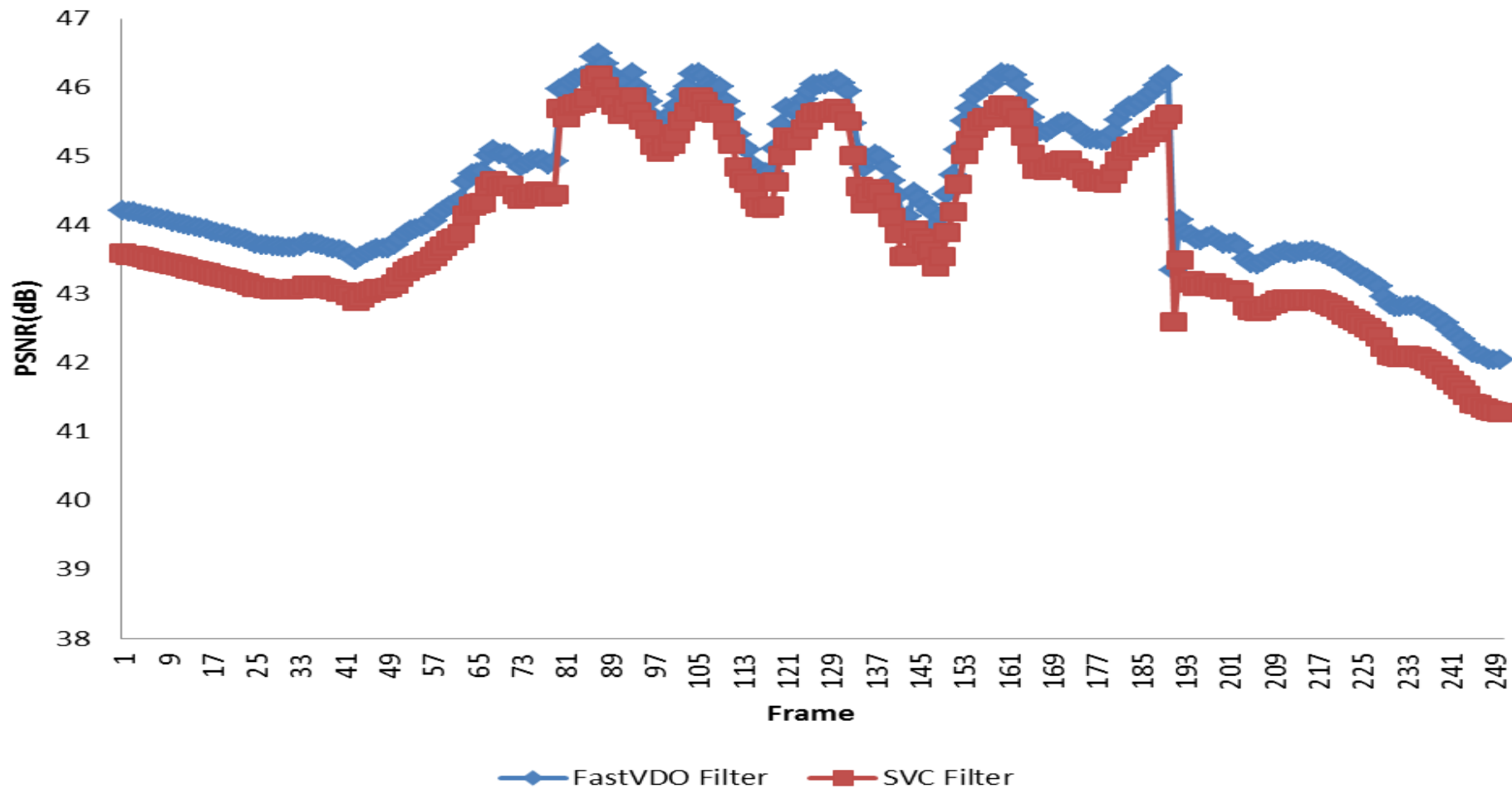
Spectral Response (Downsamplers)



Tests: Outperforms SVC Filters

- Consistent 0.7 – 1.2 dB gain in all test seqs
 - Outperforms SVC on every frame!
- Wide application in many domains
 - Spatial scalability
 - Adaptive Resolution Coding (ARC)
 - Adaptive Chroma Coding (ACC)
 - 3DV (depth map coding)

Application Example: Depth Map*



*Dancer sequence

Results

- Systematic gains against half-band filters
 - 0.7 – 1.2 dB observed in our tests
 - Same or lower complexity filters
- Suited for depth map and video

Conclusion

- Powerful spatial sampling filters
- Benchmark for depth map sampling
- Request testing in CE3