

# Estudio sobre sistemas de anti-aliasing e implementación de anti-aliasing temporal

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U-Tad - Máster Universitario en Computación Gráfica y Simulación

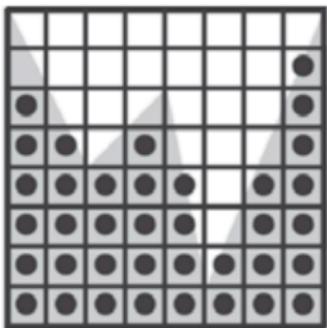
# Introducción

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# Point Sampling



(A)



(B)



(C)

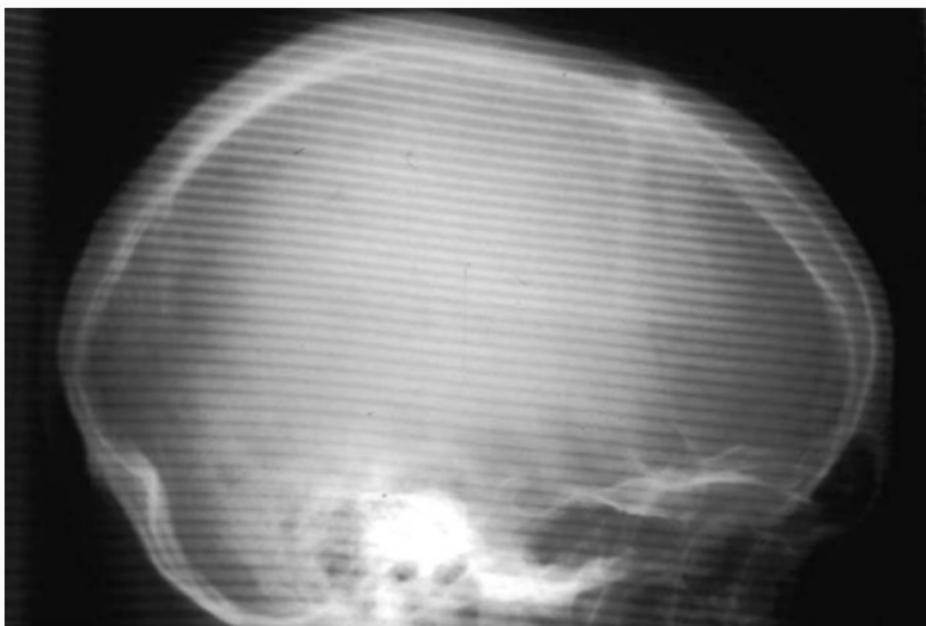
# Aliasing

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# Bordes geometría



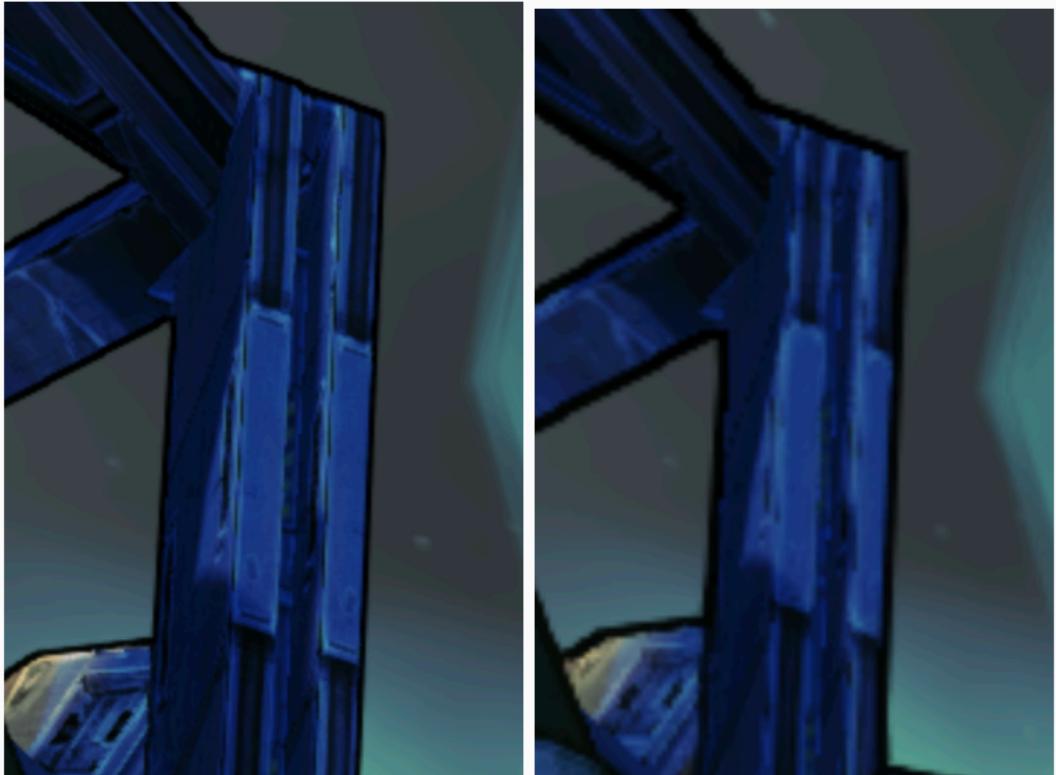
En textura



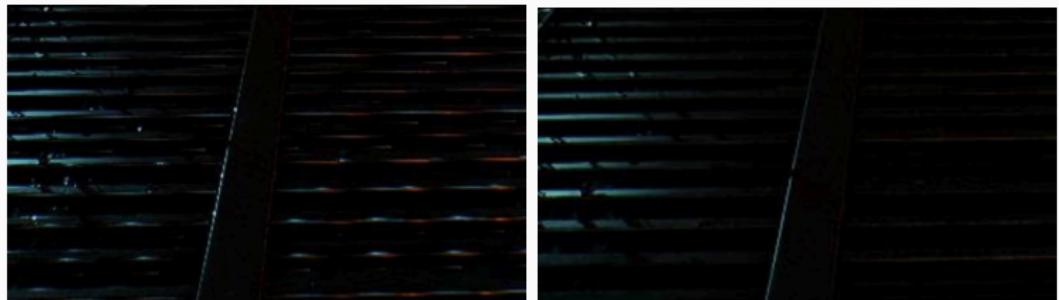
# En textura



En textura



# Especular



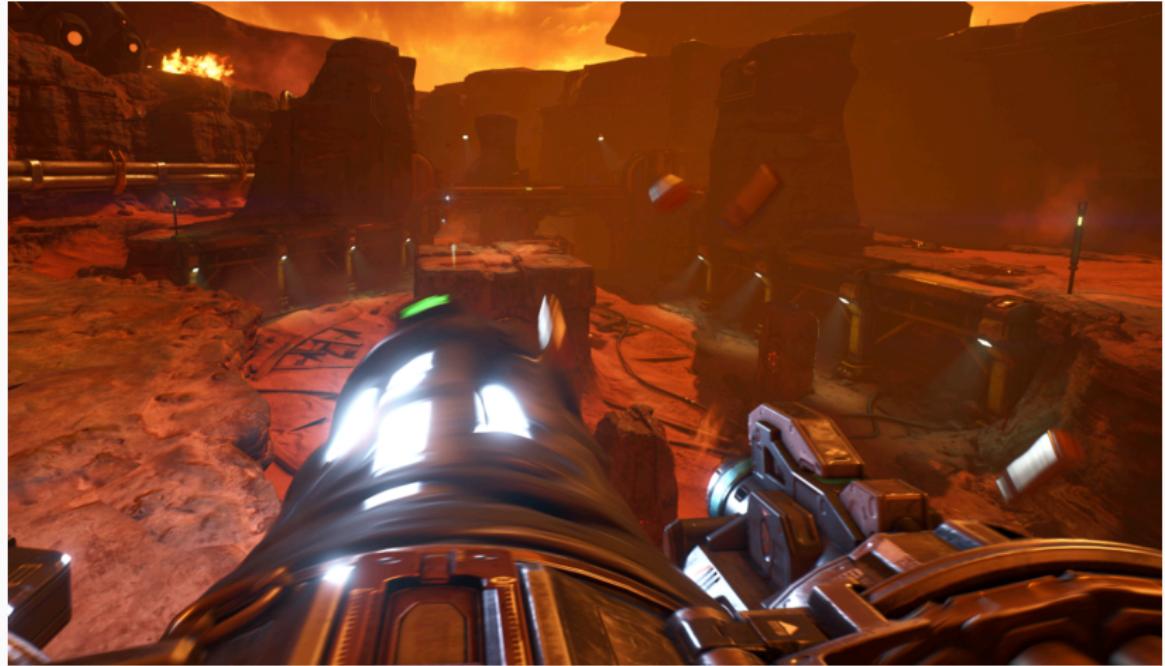
# Blur



# Blur



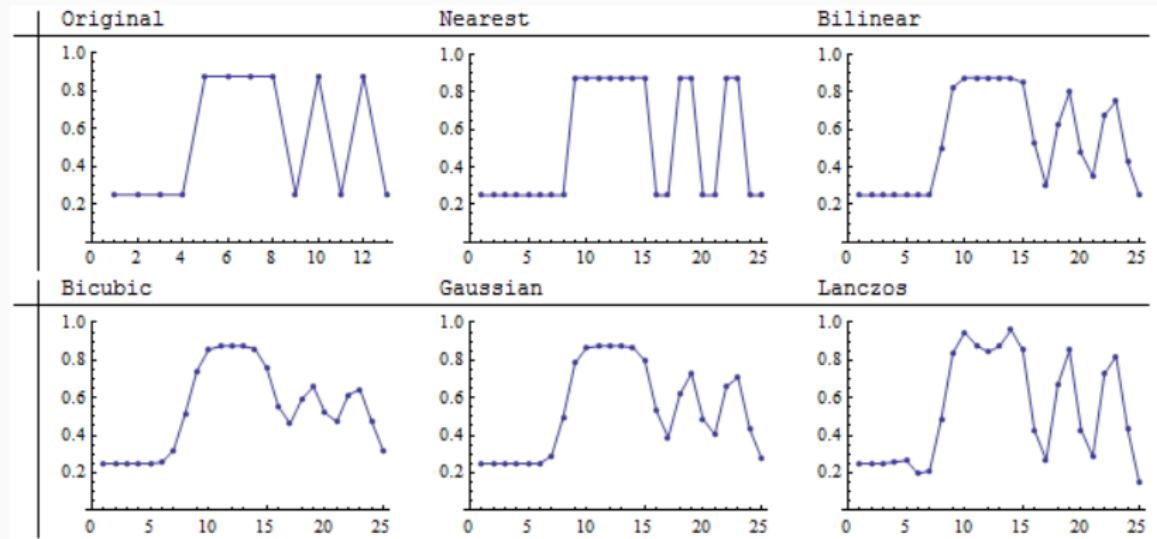
# Blur



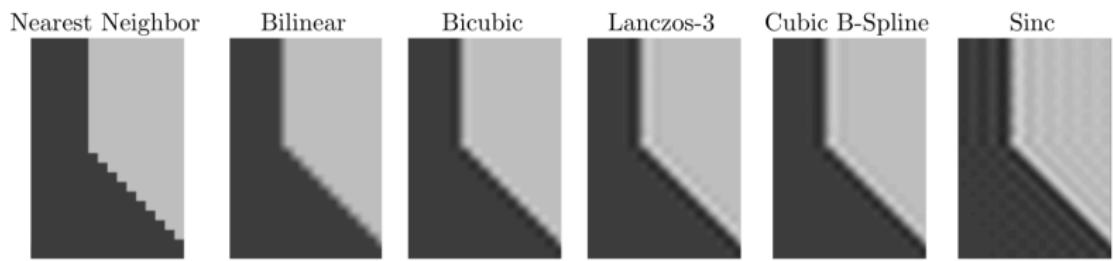
## Anti-aliasing tradicional

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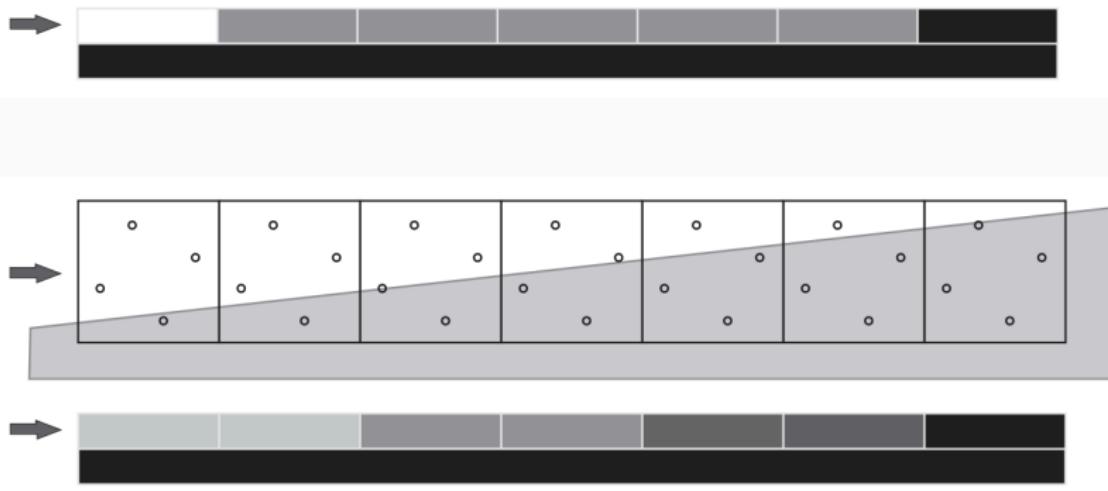
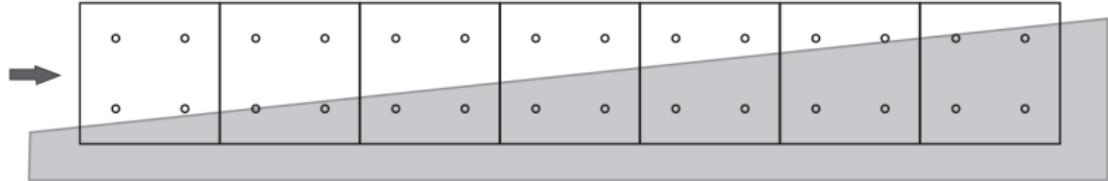
# Filtros



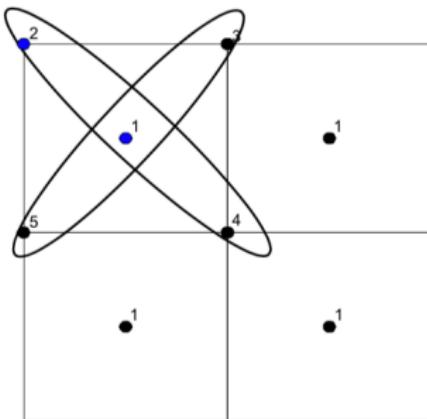
# Filtros



# Supersampling

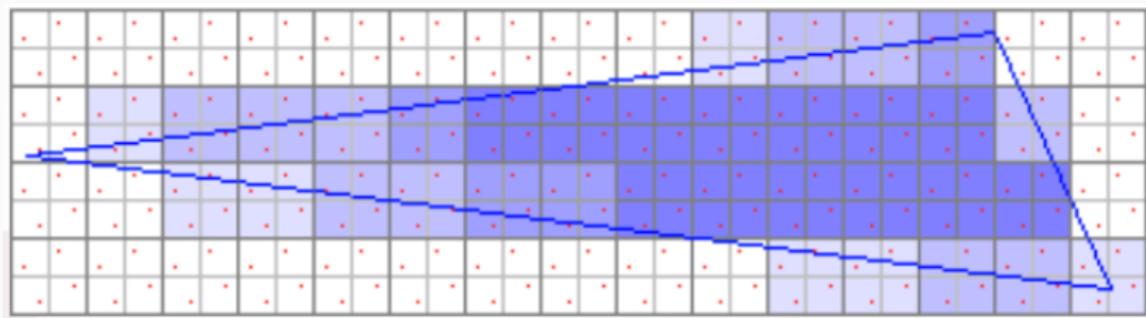


# Supersampling



Quincunx Sample Pattern

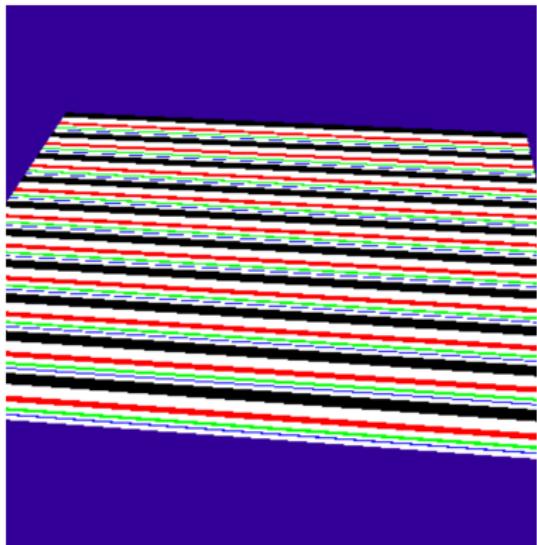
# Multisampling



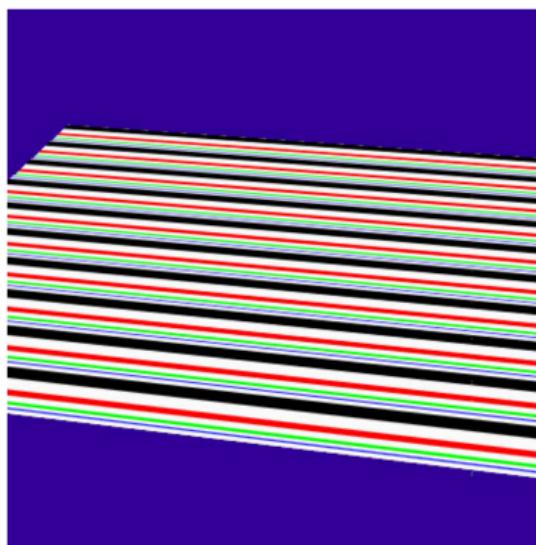
# Multisampling



# MIP Maps

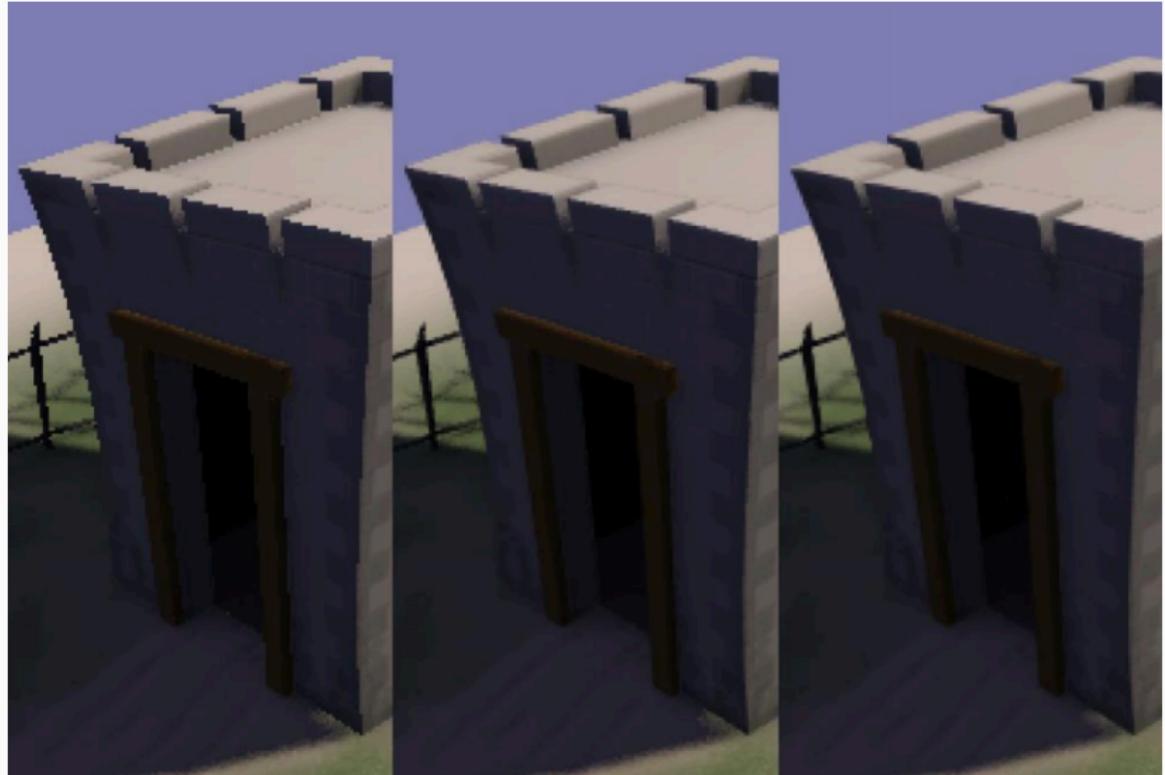


Nearest Neighbor



MIP Mapped (Bi-Linear)

FXAA



MLAA



# SMAA



## Anti-aliasing temporal

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# History Buffer

Necesario guardar frame  $n-1$  para usar en shader

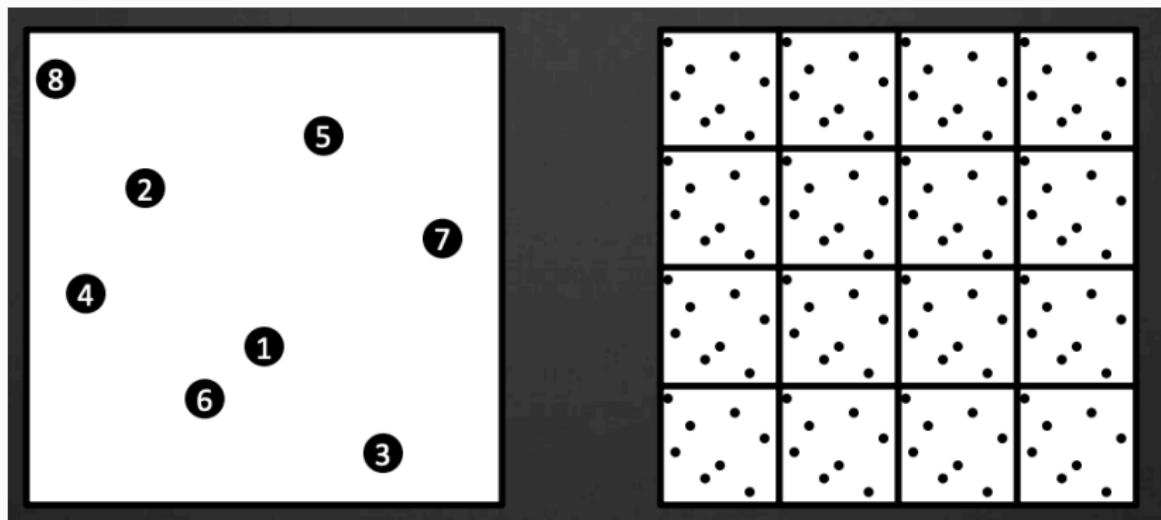


# Jitter

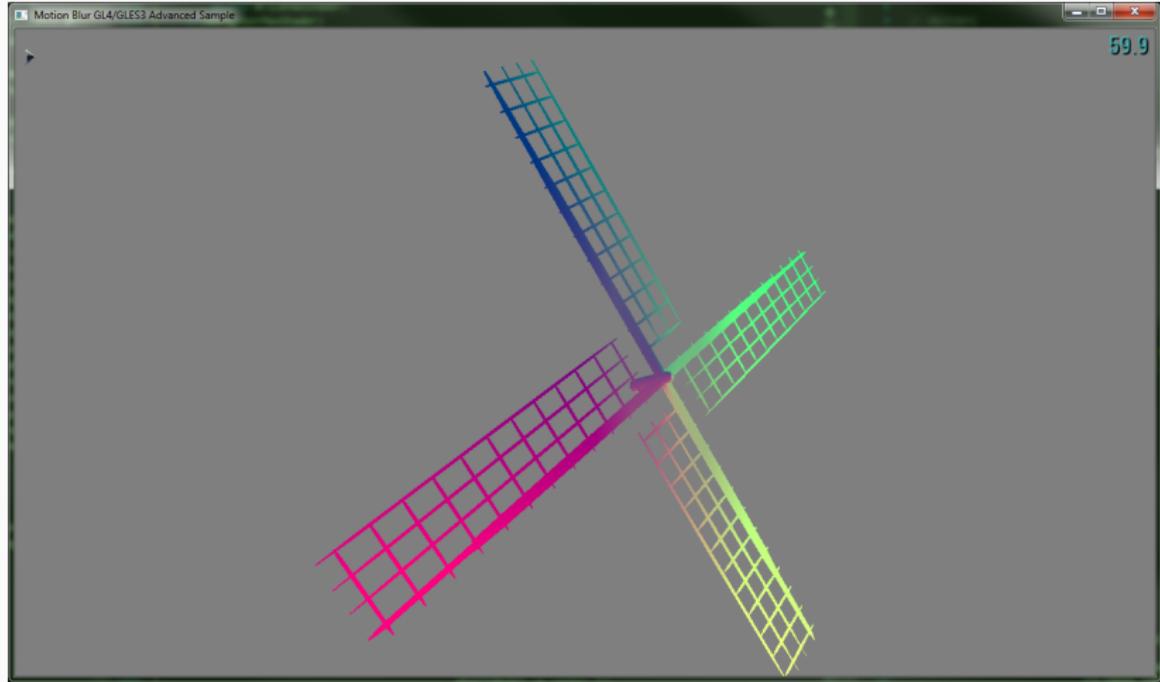
Secuencias Halton

Evita subsamples repetidos y clusters

Aplicar jitter a *MVP*

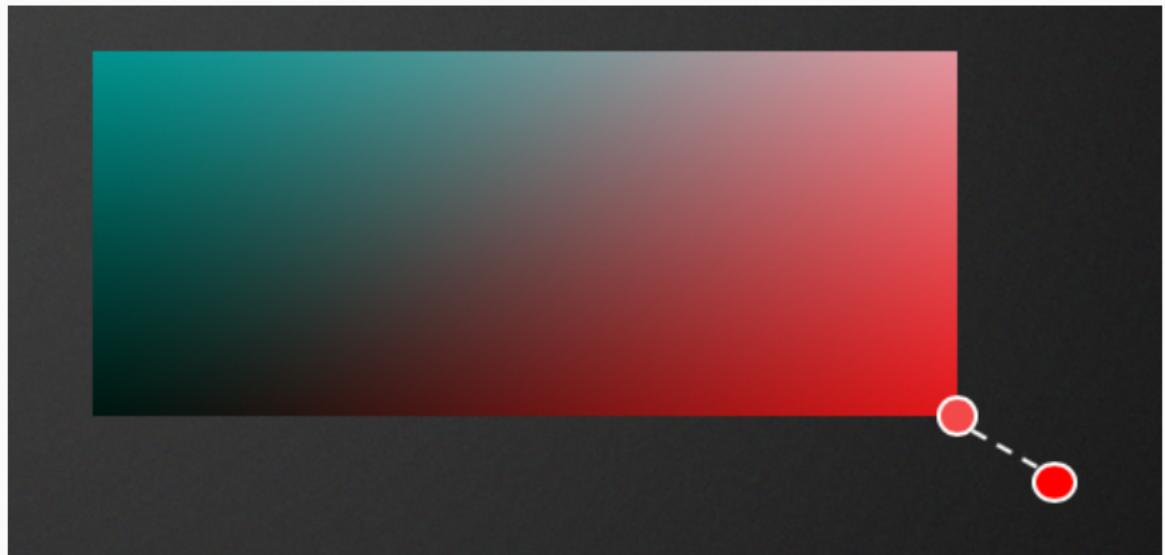


# Velocity Buffer



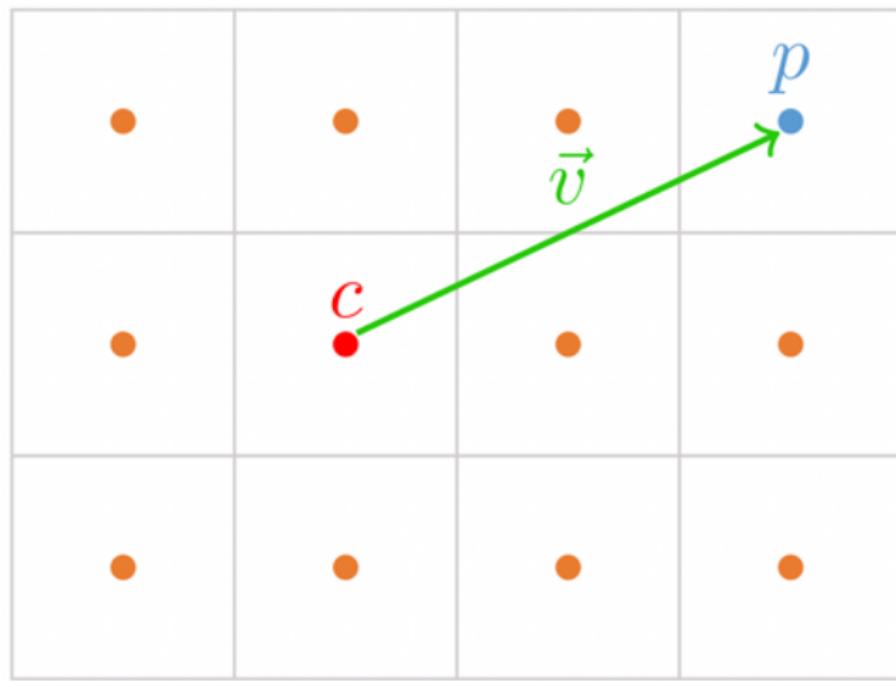
# Clamping

Mirar pixels vecinos



# Reprojection

Interpolación lineal ( 5 %)



# Sharpening

$$\begin{bmatrix} 0 & -1 & 0 \\ -1 & 5 & -1 \\ 0 & -1 & 0 \end{bmatrix}$$

# Problemas



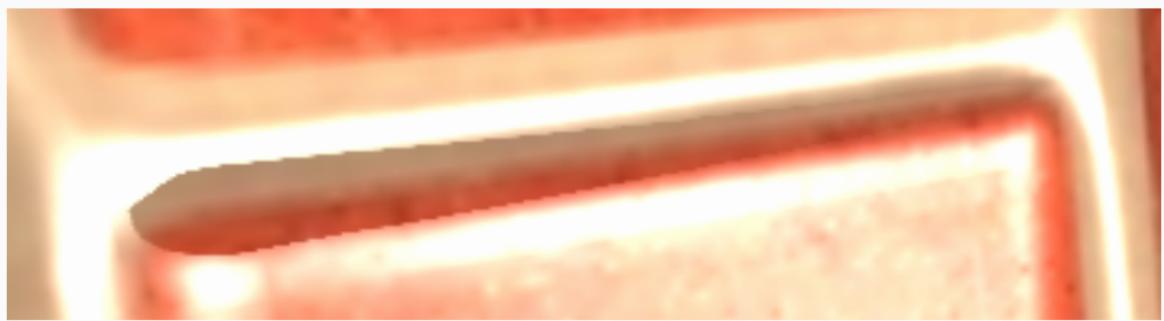
## Resultados

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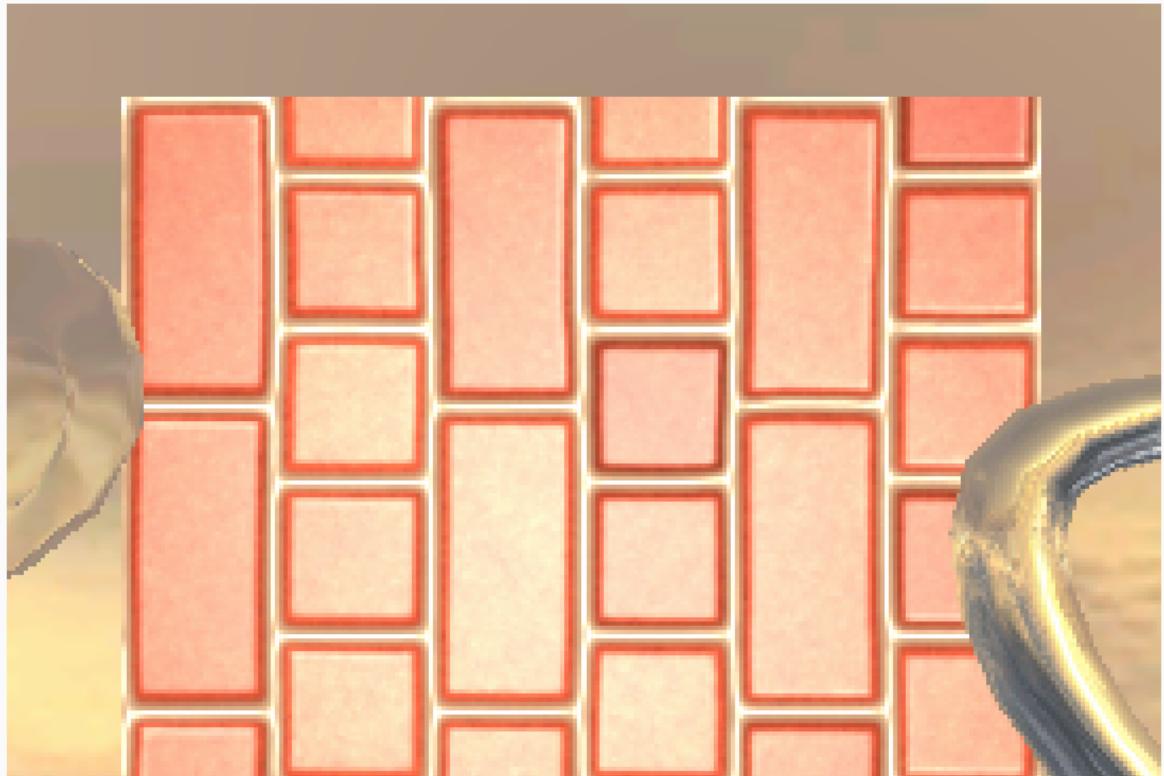
# Bordes geometría



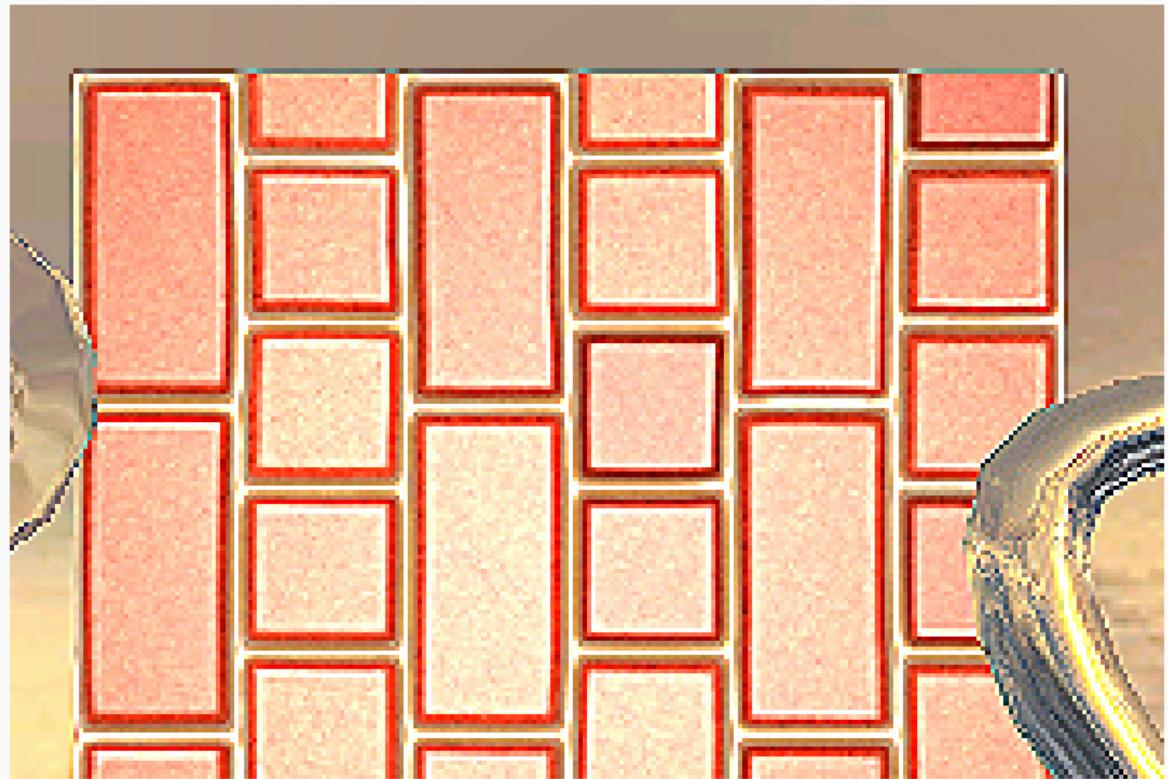
## Especular



# Sharpening



# Sharpening



## Conclusiones y mejoras futuras

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# Mejoras

- Blurring
- SSAO
- Transparencias
- Reflejos

# Mejoras



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