Alpha Distribution for Alpha Testing

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Alpha Testing
Alpha Testing
Texture
Alpha Testing

Texture

Alpha Channel
Alpha Testing
Alpha Testing

- Binary visibility
- Order independent rendering
- Supported since OpenGL 1.1
Alpha Testing

• Problems:
  – Disappearing geometry
  – No Semi-transparency
Alpha Testing

• Problems:
  – Disappearing geometry
  – No Semi-transparency
• Solutions
  – No mipmoothing
  – Globally scaling alpha values [Castano 2010]
  – Hashed Alpha Testing [Wyman and McGuire 2017]
    • Use a noise function as alpha threshold.
Traditional Alpha Testing
Traditional Alpha Testing
Alpha Testing

Traditional Alpha Testing

Hashed Alpha Testing
Alpha Distribution

for Alpha Testing
Alpha Distribution

for Alpha Testing
Alpha Distribution

dithering
Alpha Distribution

- Class of methods that distribute the alpha values of texels to other texels.

original alpha values  \[\rightarrow\]  alpha distribution  \[\rightarrow\]  new alpha values
• Two Alpha Distribution methods:
  1. Error diffusion [Floyd and Steinberg 1976]
  2. Alpha Pyramid
• Error diffusion [Floyd and Steinberg 1976]
  – Perform quantization to each texel in scanline order
  – Distribute the quantization error to neighbors
• Alpha Pyramid
Traditional  Scaled Alpha  Hashed Alpha Test  

Alpha Distribution with Error Diffusion  Alpha Pyramid  Reference
Alpha Distribution

• Alpha-to-coverage
  – More then two quantization levels
  – 2 methods for picking “covered” samples
    • Sample Mask Texture
      – Precomputed sample masks, instead of alpha values.
    • Hashed Sample Mask
      – Randomly pick samples in fragment shader
Limitations of Alpha Distribution
Limitations
of Alpha Distribution
Limitations

- Pixelated edges with magnification filtering.
Limitations

• Regular sampling artifacts
Limitations

- Regular sampling artifacts (removed with jittering)
Conclusion

Alpha Distribution
Conclusion

Alpha Distribution
• Pre-process
• No shader code for alpha testing
• Low noise