Mixing

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// create a value of 0. or 1. from the value of x wrt edge:
float t = step( float edge, float x );

// create a value in the range 0. to 1. from the value of x wrt edge0 and edge1:
float t = smoothstep( float edge0, float edge1, float x );

// use the returned value from step( ) or smoothstep( ) to blend value0 to value1:
T out = mix( T value0, T value1, float t );
in float vX, vY;
in vec4 vColor;
in float vLightIntensity;

uniform float uA;
uniform float uP;
uniform float uTol;

const vec4 WHITE = vec4( 1., 1., 1., 1. );

void main( )
{
float f = fract( uA*vX );

float t = smoothstep( 0.5-uP-uTol, 0.5-uP+uTol, f ) - smoothstep( 0.5+uP-uTol, 0.5+uP+uTol, f );
gl_FragColor = mix( WHITE, vColor, t );
gl_FragColor.rgb *= vLightIntensity;
}
Fun With One

Moral: There are many ways to turn [0. - 1.] into [0. - 1.]
Why Do These Two Curves Match So Closely?

\[ y = \sin^2 \left( \frac{\pi}{2} x \right) \]

\[ y = 3x^2 - 2x^3 \]

The Taylor Series expansion of \( y = \sin^2 \left( \frac{\pi}{2} x \right) \) around \( x=0.5 \) is:

\[
y = \left( \frac{1}{2} - \frac{\pi}{4} + \frac{\pi^3}{96} \right) + x \left( \frac{\pi}{2} - \frac{\pi^3}{16} \right) + x^2 \left( \frac{\pi^3}{8} \right) - x^3 \left( \frac{\pi^3}{12} \right)
\]

\[= 0.038 - 0.37x + 3.88x^2 - 2.58x^3\]

which is pretty close to: \( y = 3x^2 - 2x^3 \)
Cubic vs. Quintic

\[ y = 10x^3 - 15x^4 + 6x^5 \]

\[ y = 3x^2 - 2x^3 \]

Both go from 0. to 1.
Both have initial and final slopes of 0.
The quintic has initial and final curvatures of 0.