Mixing
// 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 vec3 vColor;
in float vLightIntensity;

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

const vec3 WHITE = vec3(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);
    vec3 rgb = vLightIntensity * mix(WHITE, vColor, t);
    gl_FragColor = vec3(rgb, 1.);
}
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.