Personal Reflection

Freshman summer: Watching Gilbert Strang explain *Linear Projections*, I hit pause. What if I dumped R^n, projecting *sine* onto *polynomials*? A calculus student, I knew polynomials were approximators, and since I'd learned functions form an inner product space, I'd wanted to do something…

Linear Algebra arose as a desire to understand vectors, but I'd long left arrows.

My strategy: swap the R^n *dot-product* with the *function inner-product* in Projection Formula. That led to integral-bashing, popping an innocent-looking cubic. Was it close to sine? To Desmos!

Joy: I could *barely* tell them apart. I couldn't resist checking the *Taylor approximation* for sine. It was miles away!

Power: Couldn't I turn the tables and approximate polynomials *using* sines by the same

algorithm? I'd left Taylor behind too.

Later, at Euler Circle, I would learn this as *Fourier Series*. But generalization didn't stop there. Thus, *Peter-Weyl* theorem, and my expository paper was born.