Cultivating curves

We in the sciences use mathematics, our alternate language of choice, when words from the dictionary only provide a most imprecise version of voice. And those dense equations explain in detail how things we study behave. They are filled with the symbols that never will fail to reveal a gravitational wave, or other phantasms concealed but then over whose ken we rejoice. But the math is so dry and the symbols remote, their full meaning remains out of reach until we devise a much better way both to learn for ourselves and to teach. Oh the curve, the curve, the wonderful curve, as useful as it’s elegant. It shows us the essence of all it plots out; do without it?—in fact we just can’t.

Thanks to Herr Kepler, our space probes and ships will know what to expect in the cosmos. They know that their orbits will trace an ellipse when to planets or stars they come too close. An orchestra’s timpani along with its snare are where rhythmic patterns are found. Would their music have filled as much of the air had Bessel not figured the source of their sound? According to every biologist’s oath, a precipitate rise of whatever’s essential is always accompanied by unbounded growth, and must be exposed by a pure exponential.

Probes after light years will find on arrival halos of dark matter in ample supply, but only ‘round galaxies known to be spiral where stars move more slowly when they fly by. Oscillations harmonic control many things that require engineering designs. To account for the frequencies nature oft brings, Monsieur Fourier suggests we sum sines. Parabolic trajectories are the outcome when balls are tossed in the air. When a comet swings by with enough energy, it’s a stunning hyperbolic affair.

For these symbols of science on TV and logos, we are indebted to Monsieur Lissajous. The gist of our message in simplest of prose is a hearty “merci beaucoup.” The perennial battle twixt Gauss and Lorentz cannot be resolved by statistics. We must rely on the elements of the spectral line’s characteristics. Going off on a tangent is just a cliché unless sine over cosine is nigh. And if one over cosine is play of the day, then the secant is here to apply.

If ever advised in a classroom one day that “grading will be on a curve,” suggest that all students and you choose the curve that is used to determine your fate. Expect that the Gaussian will still be preserved but it should make for a thrilling debate.

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