Construction of a Conformal Mapping: Glitter

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Small pieces of plastic from 0.05 mm to 0.5 mm, called microplastics, pollute the ocean by congregating and moving through oceanic currents. Initial regions were defined along coasts to represent where microplastics are deposited into the ocean. For each region, research was conducted to determine where oceanic currents would move microplastics. Corresponding points were fixed along the coast of each region and found in terms of (?,?,F) for both initial and final regions. A combination of spherical to Cartesian conversions and the Riemann Mapping Theorem allowed for a formula to be derived. This formula was written in a Java program to convert spherical coordinates to two-dimensional Cartesian coordinates. The new coordinates were written as complex numbers and applied to Möbius Transformations. A three-point, cross-ratio Möbius Transformation was used for corresponding initial and final points. When f(z) was solved for w, equations were found that represented oceanic currents. When applied to a conformal mapping viewer, each equation portrayed an image where the final region should have been. When each equation was tested and the final regions were displayed, it was confirmed that the equations were accurate. Each equation can be used with real points to determine where pollutants will converge.

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