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An Invitation to Homological Mirror Symmetry

We will give a gentle introduction to some recent developments in the area of mirror symmetry, focusing on two key conjectures in the field: Kontsevich's homological mirror symmetry (1994), which relates the Fukaya category of a symplectic manifold to the derived category of coherent sheaves of a mirror space, and the Strominger-Yau-Zaslow (SYZ) conjecture (1996), which gives a geometric underpinning for the construction of mirror spaces. We will use simple examples to illustrate these conjectures and their extension beyond the Calabi-Yau setting in which they were first formulated. Specifically, we will focus on two one-dimensional examples, the cylinder and the pair of pants, to give a flavor of the geometric concepts involved in a general formulation of homological mirror symmetry.