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Maria Mannone* (manno012@umn.edu). *Theoretical Physics and Category Theory as Tools for Analysis of Musical Performance and Composition.*

Musical performance starts from an indication of movement (a curve) hidden in the score, which then is transformed by the musician into a physical gesture (another curve), connecting the symbolic reality of the score to the physical reality of acoustics. Composition from improvisation follows the inverse path, from physical to symbolic. Symbolic gestures can be ideally transformed into physical ones via a connecting surface, as a “world-sheet” in physics. This formalism can be applied to any musical instrument, including the voice. The relations between gestures on different musical instruments can be framed through category theory, allowing comparison within music itself, and between music and other fields. Experiments in which images and gestures in the visual arts have been transformed into music have their explanation in categorical terms, via gestural analogies and similarity. In fact, the mathematical definition of musical gestures, apart from explaining and modeling musical practice, may constitute a musical element itself in composition. We conclude the presentation with some examples of music from images, and an excerpt from an original orchestral piece, where gestural analogies and morphisms connect instruments and sounds. (Received August 26, 2016)