COMPOSING TRAJECTORIES

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This working session will focus on the problem of how to compose a path on a plane given two functions over time (e.g. x(t) and y(t) in a cartesian plane), or, the inverse problem of decomposing a given path into two functions over time. The problem of composing and decomposing planar paths have been the subject of recent individual and classroom teaching experiments conducted by the coordinators and their colleagues. Through these activities we tried to enrich high school students' capability to imagine motion in space as defined by parametric functions. Gestures, utterances, and tool-use were focal aspects of our analysis.

The working session will be divided in two parts. During the first half the participants will work with tools and activities that involve the composition and decomposition of paths on a plane. During the second half the participants will analyze selected episodes filmed in individual and classroom teaching experiments. The coordinators will bring videotapes and transcriptions for the selected episodes.

The research questions for the session will be about the roles of physical experiences in mathematics learning and about the development of imagination. This question will be explored through the participants' engagement with the tools and activities as well as through the analysis of classroom interactions.