GAIA Seminar

✎ **Title : "GAIA Spring School on Differential Geometry"**
for computer scientists

✎ **Speaker : Kang-Tae, Kim(POSTECH & The SRC-GAIA)**

✎ **Place : Math Science Building room 404**

✎ **Lecture 1 (2pm- 3:30pm , May 30)**
- Fundamentals of Plane Cuves

The concept of curvature is the central theme of differential geometry. But why is it so important? How was it developed? What can one do with it? All such questions are natural, important and not-so-easy-to-explain-the-answer-of. I will start with an ancient(?!) explanation based upon the concept of "three consecutive points" of intersection, which can be understood as the triple-root in modern language. Then the powerful and fundamental Mean-Value-Theorem of Calculus will lead us into the concept of curvature. As soon as we get this "intuitive" understanding, we shall see the lights shed on the differential equation method differential geometry and its interpretation by dynamics. This will be a "gentle" break-in toward the next lecture.

✎ **Lecture 2 (10am-11:30am, May 31)**
- Principal curvatures and Euler's local theory of surfaces

Once the plane curve theory is "understood", it serves as the key to an understanding of the Euler theory. I will explain Leonard Euler's description of surfaces. Then I will introduce how the theory of curves and surfaces was developed in mathematics. Although more modern developments in mathematics tend to take the path of becoming more abstract and ambitious (to encompass everything in their arms),
we shall stay in the concrete questions such as: What (re)constructs the surfaces (on a "screen")? How does one adapt differential geometric (hence continuous) theories to the discrete situations (such as in a computer)? Honestly, I do not know the answers that can be acceptable to the computer scientists. But I will give a try and I wish to be able to communicate with the audience in the workshop, based upon these lectures.

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