

Dynamic Applications for Learning and Exploring Mathematics Using Computer Algebra

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We discuss designing self-contained electronic documents that form a microworld for student investigations; we call these ACR documents. The documents include a CAS application in which students engage in ‘sandboxed’ mathematical exploration. The inquiry-based exploration is led by a set of questions in the document that guide students, experimenting in the computer algebra and dynamic geometry microworlds, that are formulated under the *Action-Consequence-Reflection paradigm*.

The *Action-Consequence-Reflection paradigm* is a research-based pedagogical approach that provides students with a microworld in which to take a mathematical action, observe the consequences of their action, and reflect on the observed behaviour in order to construct mathematical understanding. This paradigm is the basis of the $\Delta\mu$ project which constructed several exemplars and templates for faculty.

We will begin our session with examples of ACR documents, the student exercises/projects that they support, and instructor guides. A screenshot of a sample ACR document is shown in Figure 1. Then we will move to discussing how to construct ACR documents using Maple 2019 or TI Nspire as our computer algebra substrates. Last, we discuss formulating questions that are the crucial part of the project for students. We’ll close with pointers to further information and participant discussion & questions.

Keywords

Dynamic computer algebra pedagogical applications, Action-Consequence-Reflection paradigm

References

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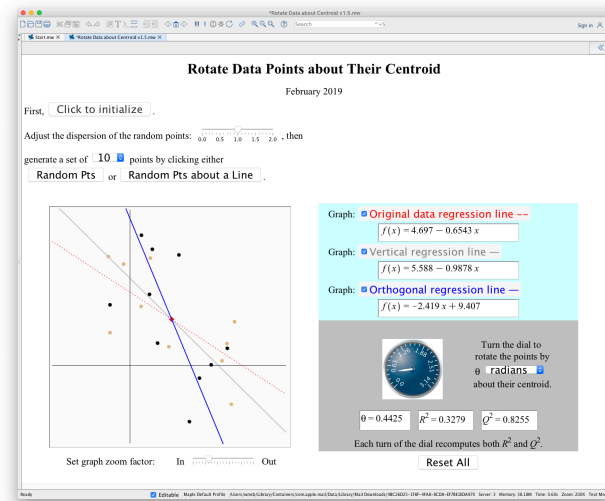


Figure 1: Linear Regression ACR Maple 2019 Worksheet

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