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Computational experiment approach to advanced secondary mathematics curriculum.

Mathematics Education in the Digital Era 3. Dordrecht: Springer (ISBN 978-94-017-8621-8/hbk; 978-94-017-8622-5/ebook). xv, 325 p. (2014).

This is a comprehensive, well-written, and meticulously organized text on computing technology for secondary mathematics teacher education. From the Preface: “This book stems from the author’s interest in and experience of using computing technology in K-12 mathematics teacher education. In particular, two decades of teaching prospective secondary mathematics teachers in technology-rich environments have led the author to believe that one of the most productive ways to teach mathematics in the digital era is through experimentation with mathematical concepts that takes advantage of computers’ capability to plot sophisticated graphs, construct dynamic geometric shapes, generate interactive arrays of numbers, and perform symbolic computations.” The text has eight chapters: 1. Theoretical foundations of computational experiment approach to secondary mathematics; 2. One-variable equations and inequalities: the unity of computational experiment and formal demonstration; 3. Computationally supported study of quadratic functions depending on parameters; 4. Computational experiment approach to equations with parameters; 5. Inequalities with parameters as generators of new meanings; 6. Computational experiments in trigonometry; 7. Advancing STEM education through TEMP: geometric probabilities; 8. Exploring topics in elementary number theory through a computational experiment. I counted 87 worked examples and 305 exercises.

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Classification: U50 U70 N10

Keywords: secondary teacher education; computational secondary mathematics

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