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Heid, M. Kathleen; Thomas, Michael O. J.; Zbiek, Rose Mary

How might computer algebra systems change the role of algebra in the school curriculum?

Clements, M. A. (ed.) et al., Third international handbook of mathematics education. Berlin: Springer (ISBN 978-1-4614-4683-5/hbk; 978-1-4614-4684-2/ebook). Springer International Handbooks of Education 27, 597-641 (2013).

Summary: Computer algebra systems (CAS) are software systems with the capability of symbolic manipulation linked with graphical, numerical, and tabular utilities, and increasingly include interactive symbolic links to spreadsheets and dynamical geometry programs. School classrooms that incorporate CAS allow for new explorations of mathematical invariants, active linking of dynamic representations, engagement with real data, and simulations of real and mathematical relationships. Changes can occur not only in the tasks but also in the modes of interaction among teachers and students, shifting the source of mathematical authority toward the students themselves, and students' and teachers' attention toward more global mathematical perspectives. With CAS a welcome partner in school algebra, different concepts can be emphasized, concepts that are taught can be done so more deeply and in ways clearly connected to technical skills, investigations of procedures can be extended, new attention can be placed on structure, and thinking and reasoning can be inspired. CAS can also create the opportunity to extend some algebraic procedures and introduce and assist exploration of new structures. A result is the enrichment of multiple views of algebra and changing classroom dynamics. Suggestions are offered for future research centred on the use of CAS in school algebra.

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