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Visualizing roots of complex functions using sibling curves

Abstract

This talk examines a methodology for visualizing real and complex roots of polynomial equations, motivated by a chemical problem [1-2]. After that, this method is extended in order to visualize other well-known complex variable functions like exponentials, trigonometric and hyperbolic functions.

It should be commented that the main idea exposed here was firstly proposed by H. Fehr [3] and later developed by A. Harding and J. Engelbrecht [4-5-6].

Finally, it is important to remark that for a better visual representation the GeoGebra application is widely used.

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[2] Martinez-Luaces, V., & Guineo-Cobs, G. (2002). Numerical Calculus and Analytical Chemistry. In *Proc. 2nd Int. Conf. on Teaching Mathematics*, Crete, Greece: Wiley.

[3] Fehr, H. (1951). *Secondary Mathematics*, Washington DC: Heath.

[4] Harding, A., & Engelbrecht, J. (2007). Sibling curves and complex roots 1: Looking back. *International Journal of Mathematical Education in Science and Technology* 38(7), 963-974.

[5] Harding, A., & Engelbrecht, J. (2007). Sibling curves and complex roots 2: Looking ahead. *International Journal of Mathematical Education in Science and Technology* 38(7), 975-985.

[6] Harding, A., & Engelbrecht, J. (2009). Sibling curves 3: imaginary siblings and tracing complex roots. *International Journal of Mathematical Education in Science and Technology*, 40(7), 989-996.