USING LISP AS A TOOL FOR MATHEMATICAL EXPERIMENTATION

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Short description of the workshop: aims and underlying ideas

In this workshop, we propose to present the high-level programming language LISP as a tool for mathematical simulation and experimentation in a secondary mathematical educational environment. The computer algebra system Maxima was implemented using LISP language. We will introduce the fundamentals of the language and use it to study the "Impossible Problem", as named by Martin Gardner in 1979. The purpose is to show some possibilities of how students can use this tool to investigate mathematical problems. It's recommended to have a notebook or mobile device, with a Common LISP implementation, in order to better accomplish the activities. Technical details and study materials are available at www.lapmat.com.br/oficinas/problemaimpossivel.

Planned structure:

Planned timeline	Topic	Material / Working format / presenter
00 – 15 minutes	Introduction to the "Impossible Problem" (Gardner's Problem)	Gardner, 1979, 1980 / Presentation / Hugo Diniz
15 – 30 minutes	Introduction to LISP language	Computer – Haible & Stoll, 2010 – Diniz, 2016 / Software activities / Hugo Diniz
30 – 45 minutes	First functions associated to the problem	Computer – Diniz, 2016 / Software activities / Hugo Diniz
45 – 60 minutes	Proof that there is no solution to the Gardner's problem	Computer – Diniz, 2016 / Software activities / Hugo Diniz
60 – 75 minutes	Solution to the Freudenthal's problem	Computer – Freudenthal, 1969 – Sprows, 1976 – Born et al, 2006 / Software activities / Hugo Diniz
75 – 90 minutes	Discussion about mathematical investigation using high-level programming languages like LISP	Questions / Discussion / Hugo Diniz

References

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