California State University
Northridge

Department of
Mathematics

Problem of the Week

Proposed by Bernardo Ábrego and Silvia Fernández. **April 18-25**

We define a recursive sequence of points in the plane as follows: The initial point has coordinates (x_0, y_0) and all other points are obtained from their preceding point according to the formula

$$(x_{n+1}, y_{n+1}) = (x_n + y_n, x_n - y_n).$$

We also know that, after 2005 steps, we obtain the point $(x_{2005}, y_{2005}) = (2^{1003}, 2^{1004})$. Find the coordinates of the initial point.

Deadline: April 18, 2005 before 9:00 PM.
Look for the "Problem of the Week" every Monday in the Daily Sundial (Daily Spotlight section) or in our web site **www.csun.edu/math/probweek**

Rules:

1. Open to all enrolled undergraduate and graduate CSUN students.
2. The first complete and correct solution will be awarded a diploma and the choice of a "Magnetix Building Set" or a five dollar prize.
3. The winner solution and the names of the authors of all correct solutions will be published in our web site (**www.csun.edu/math/probweek**). All authors whose solutions are complete and correct will receive certificates.
4. All solutions must be typed and sent electronically. PDF, Latex, or Word files are preferred.
5. All steps of the solution must be clearly justified.
6. Email your solution with subject "Problem of the week" to

   Bernardo.Abrego@csun.edu

7. Late solutions will not be considered.
8. For any questions contact the organizers

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