Lenguages de programación

Ulises M. Alvarez
<uma@sophie.unam.mx>

17 de marzo de 2017

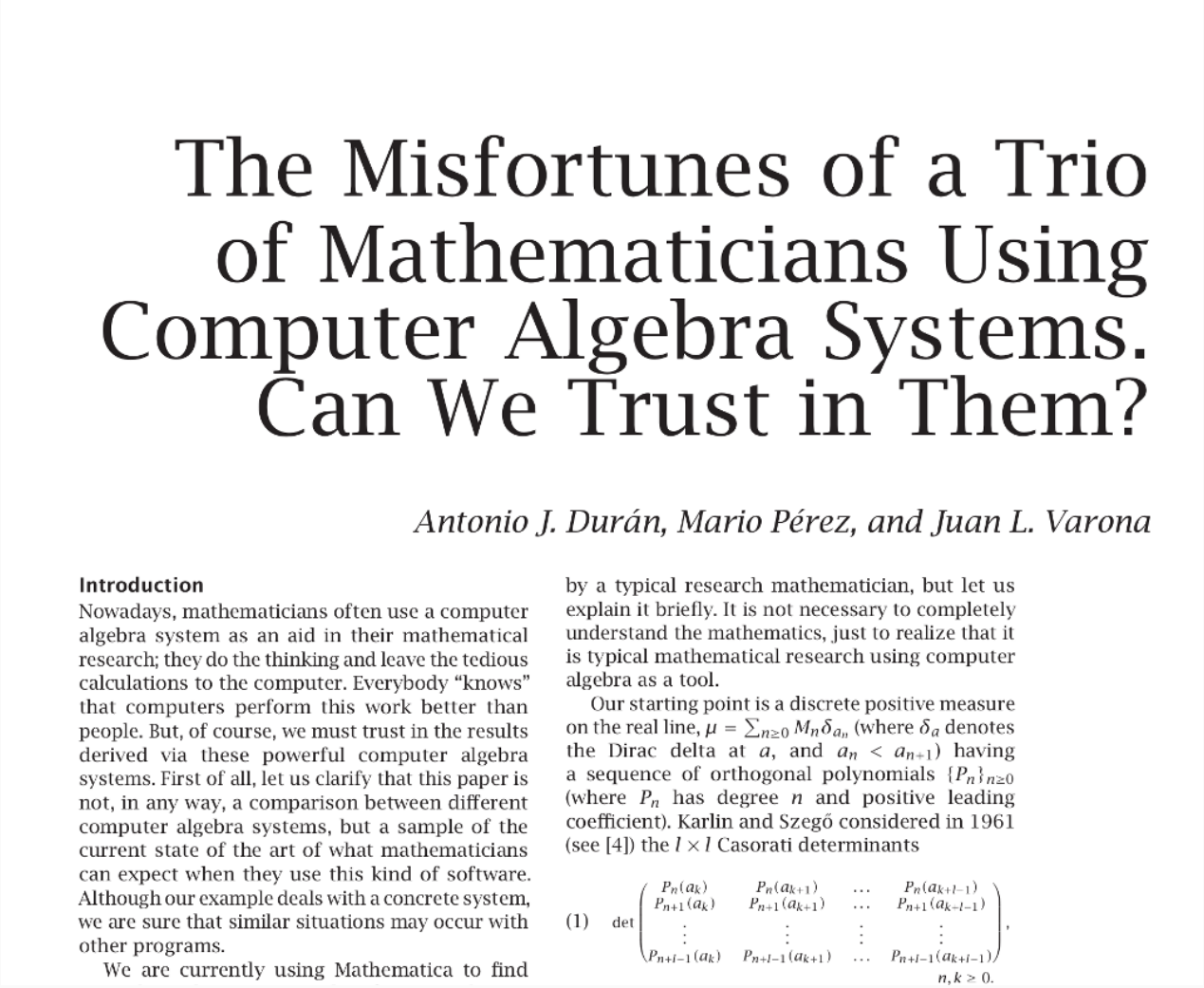
Sophie UNAM

Características

Características

- Código abierto.
- Orientado a análisis de datos.
- Presente en los principales sistemas operativos.

Código abierto



The Misfortunes of a Trio of Mathematicians Using Computer Algebra Systems. Can We Trust in Them?

Antonio J. Durán, Mario Pérez, and Juan L. Varona

Introduction

Nowadays, mathematicians often use a computer algebra system as an aid in their mathematical research; they do the thinking and leave the tedious calculations to the computer. Everybody "knows" that computers perform this work better than people. But, of course, we must trust in the results derived via these powerful computer algebra systems. First of all, let us clarify that this paper is not, in any way, a comparison between different computer algebra systems, but a sample of the current state of the art of what mathematicians can expect when they use this kind of software. Although our example deals with a concrete system, we are sure that similar situations may occur with other programs.

We are currently using Mathematica to find by a typical research mathematician, but let us explain it briefly. It is not necessary to completely understand the mathematics, just to realize that it is typical mathematical research using computer algebra as a tool.

Our starting point is a discrete positive measure on the real line, $\mu = \sum_{n\geq 0} M_n \delta_{a_n}$ (where δ_a denotes the Dirac delta at a, and $a_n < a_{n+1}$) having a sequence of orthogonal polynomials $\{P_n\}_{n\geq 0}$ (where P_n has degree n and positive leading coefficient). Karlin and Szegő considered in 1961 (see [4]) the $l \times l$ Casorati determinants

$$(1) \quad \det \begin{pmatrix} P_n(a_k) & P_n(a_{k+1}) & \dots & P_n(a_{k+l-1}) \\ P_{n+1}(a_k) & P_{n+1}(a_{k+1}) & \dots & P_{n+1}(a_{k+l-1}) \\ \vdots & \vdots & \vdots & \vdots \\ P_{n+l-1}(a_k) & P_{n+l-1}(a_{k+1}) & \dots & P_{n+l-1}(a_{k+l-1}) \end{pmatrix}, \quad n, k \geq 0.$$

Figura 1: The Misfortunes of a Trio of Mathematicians...

Análisis de datos

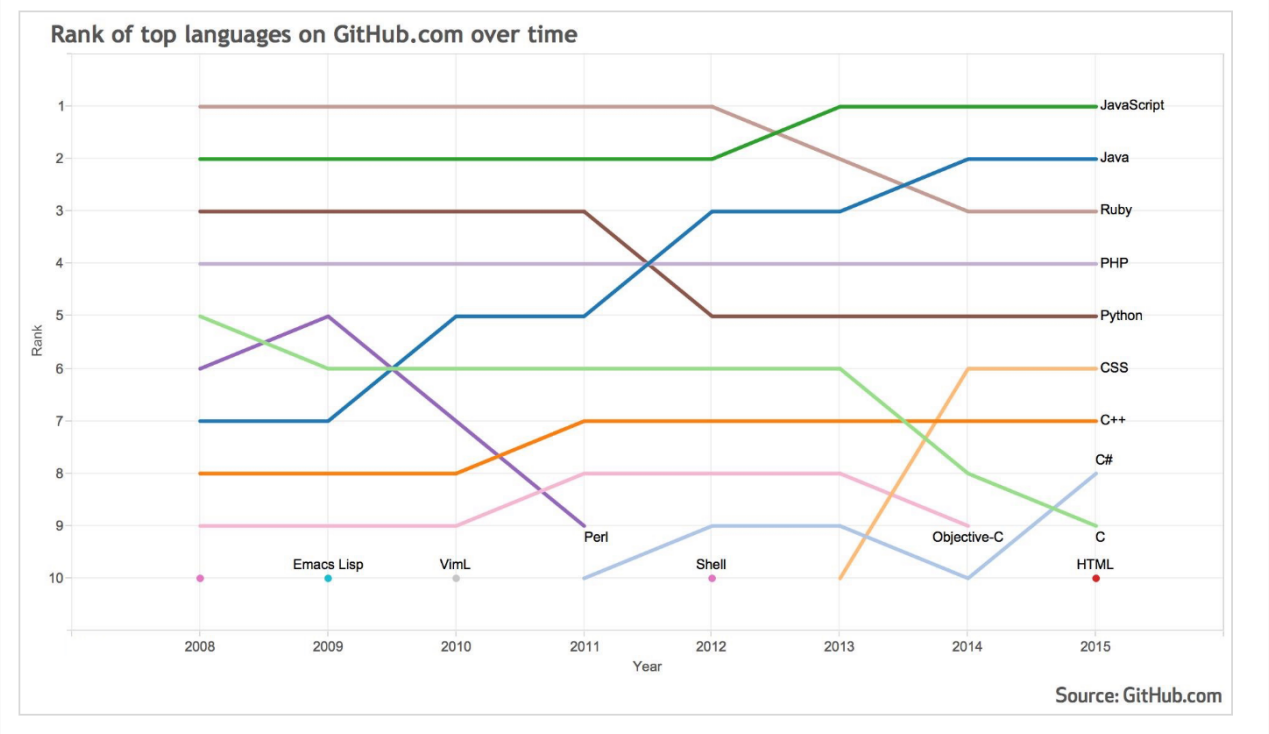


Figura 2: Tendencias en GitHub

Lenguages

Lenguajes

- Python
- R
- Julia

Lenguajes: Popularidad

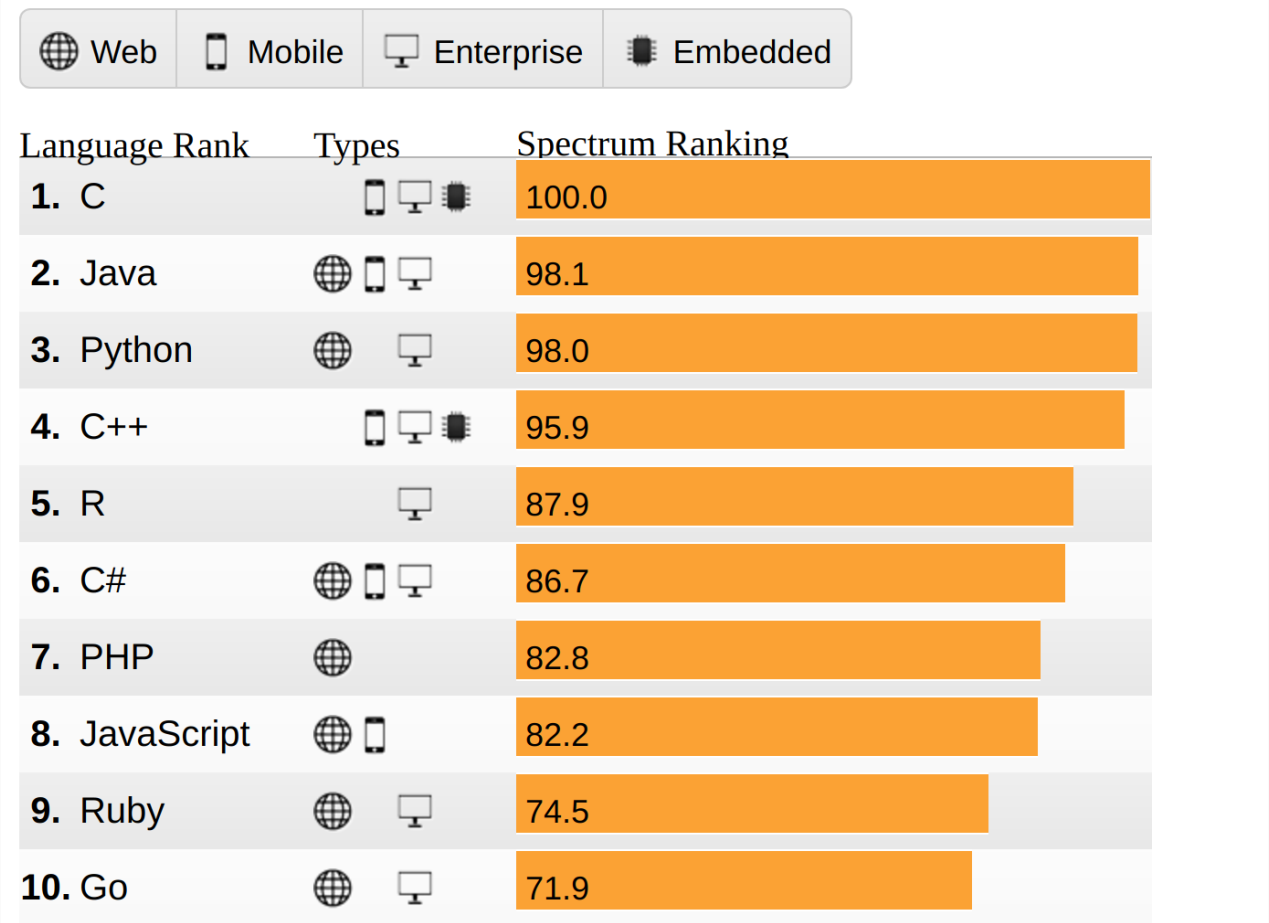


Figura 3: Tendencias en IEEE (I).

Lenguajes: Popularidad

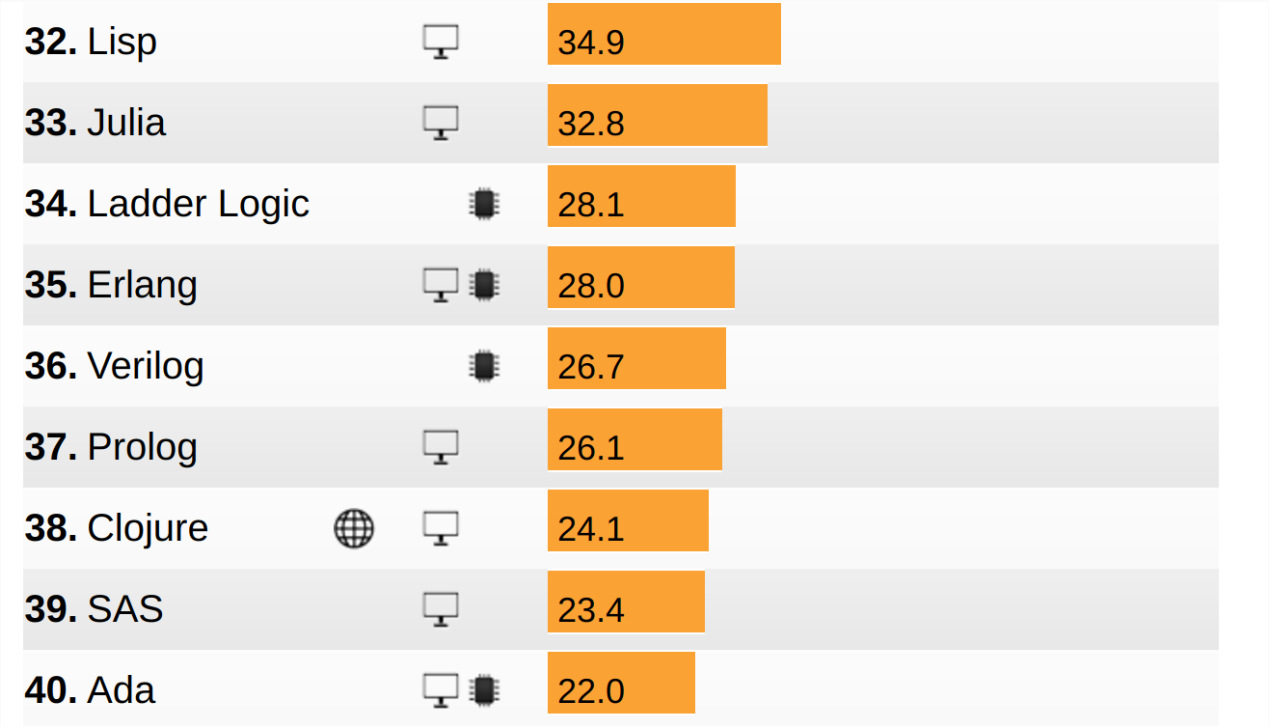


Figura 4: Tendencias en IEEE (II).

Qué lenguaje usar

Conclusiones

- Lo que use mi gremio (*siempre y cuando sea de código abierto*).
- El que se integre mejor a mi flujo de trabajo.
- Perspectiva de desarrollo académico (*no siempre el más usado es el mejor*).