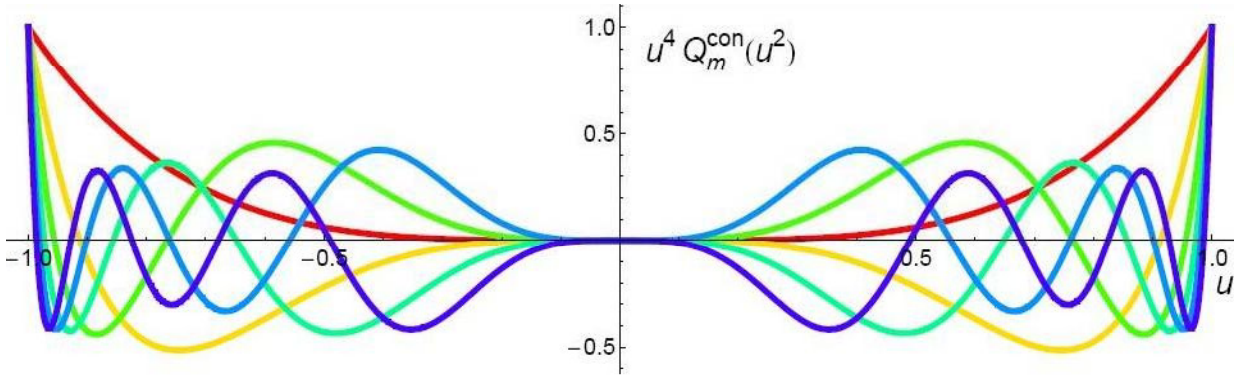
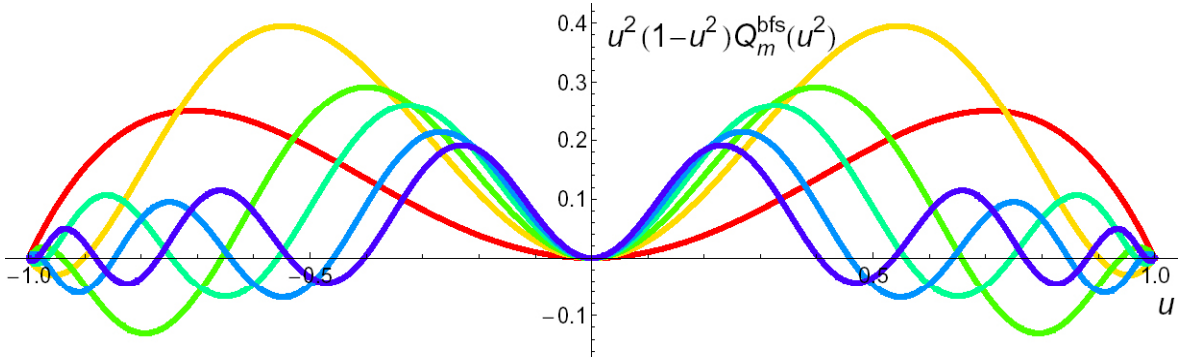
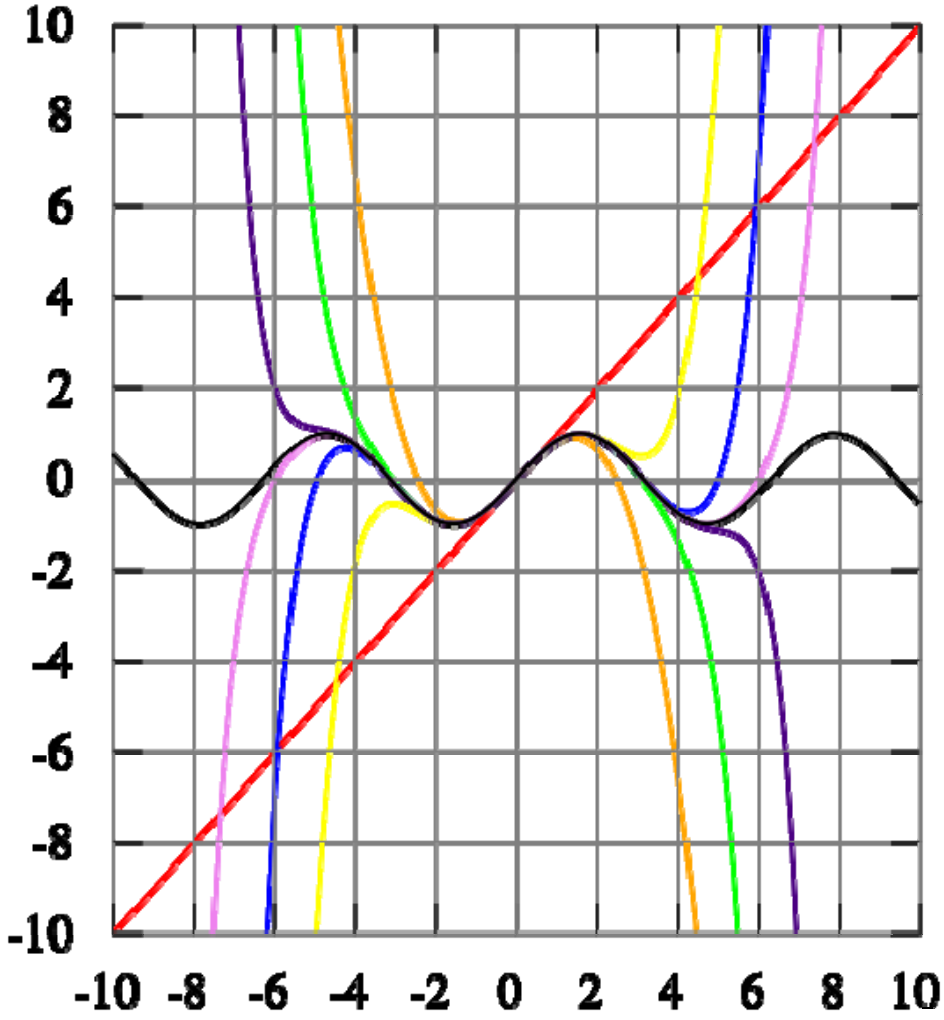
Introdução aos Polinómios Ortogonais



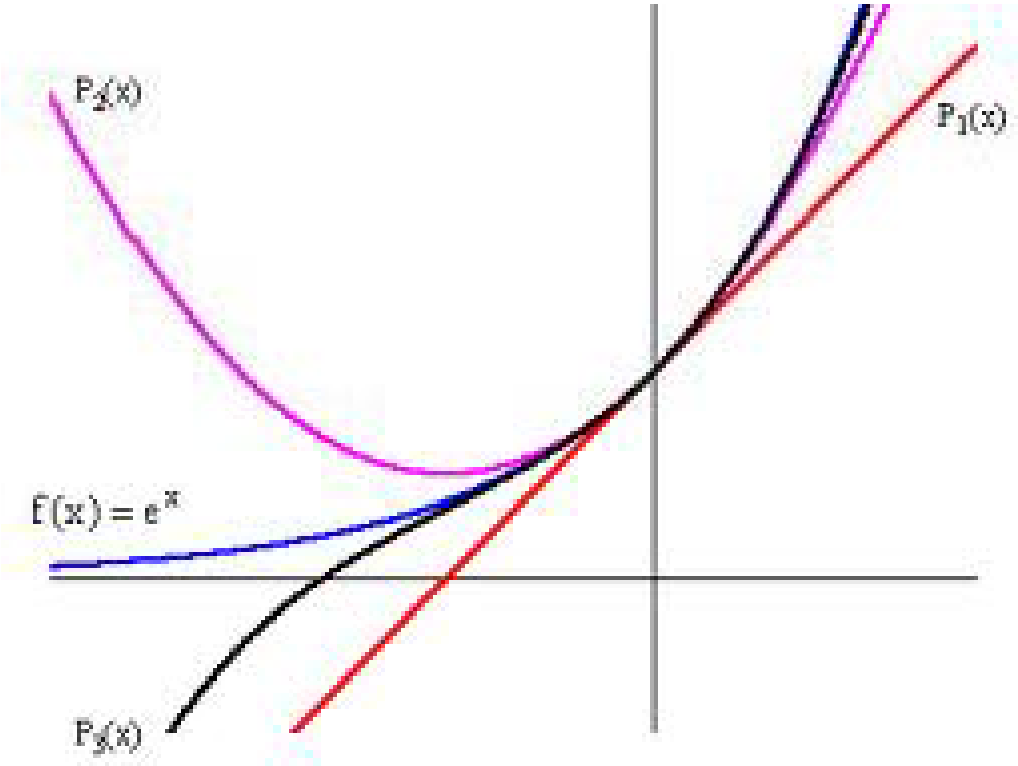


Índice de Conteúdos

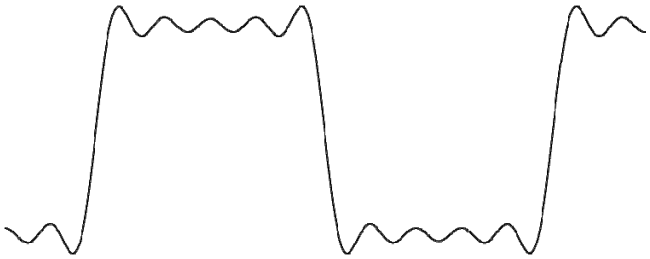
I. Aproximação com polinómios: Serie de Taylor

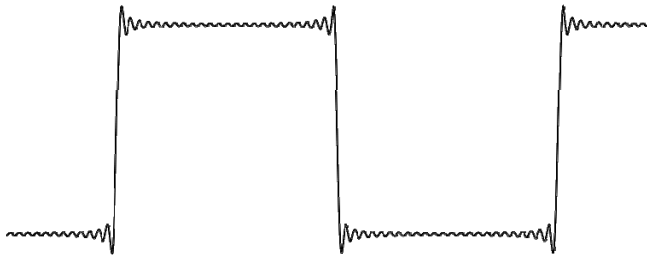


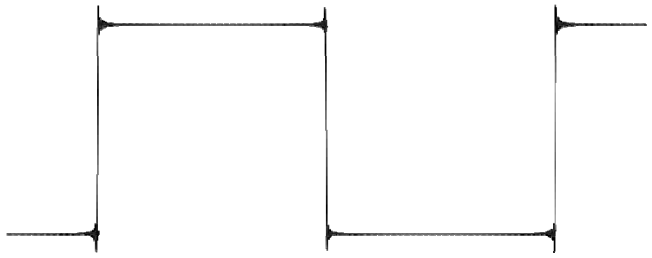
I. Aproximação com polinómios: Serie de Taylor



I. Aproximação com polinómios: Problema: fenômeno de Gibbs







II. Compressão de Informação
Imagens

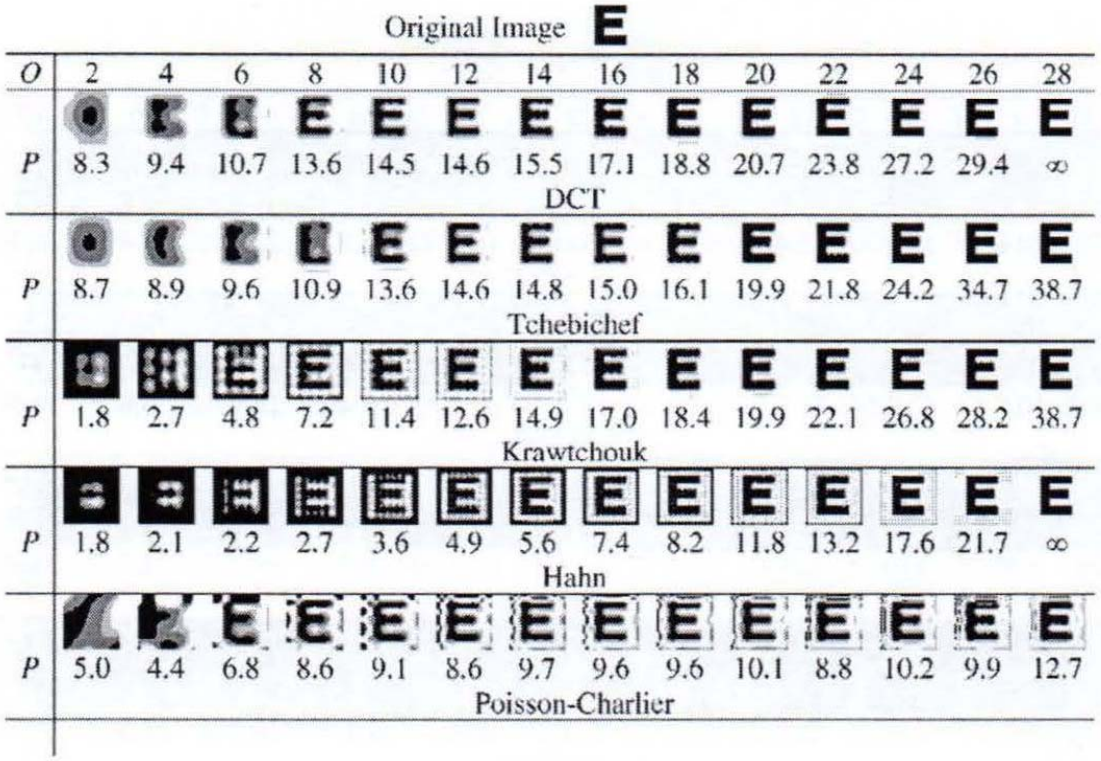
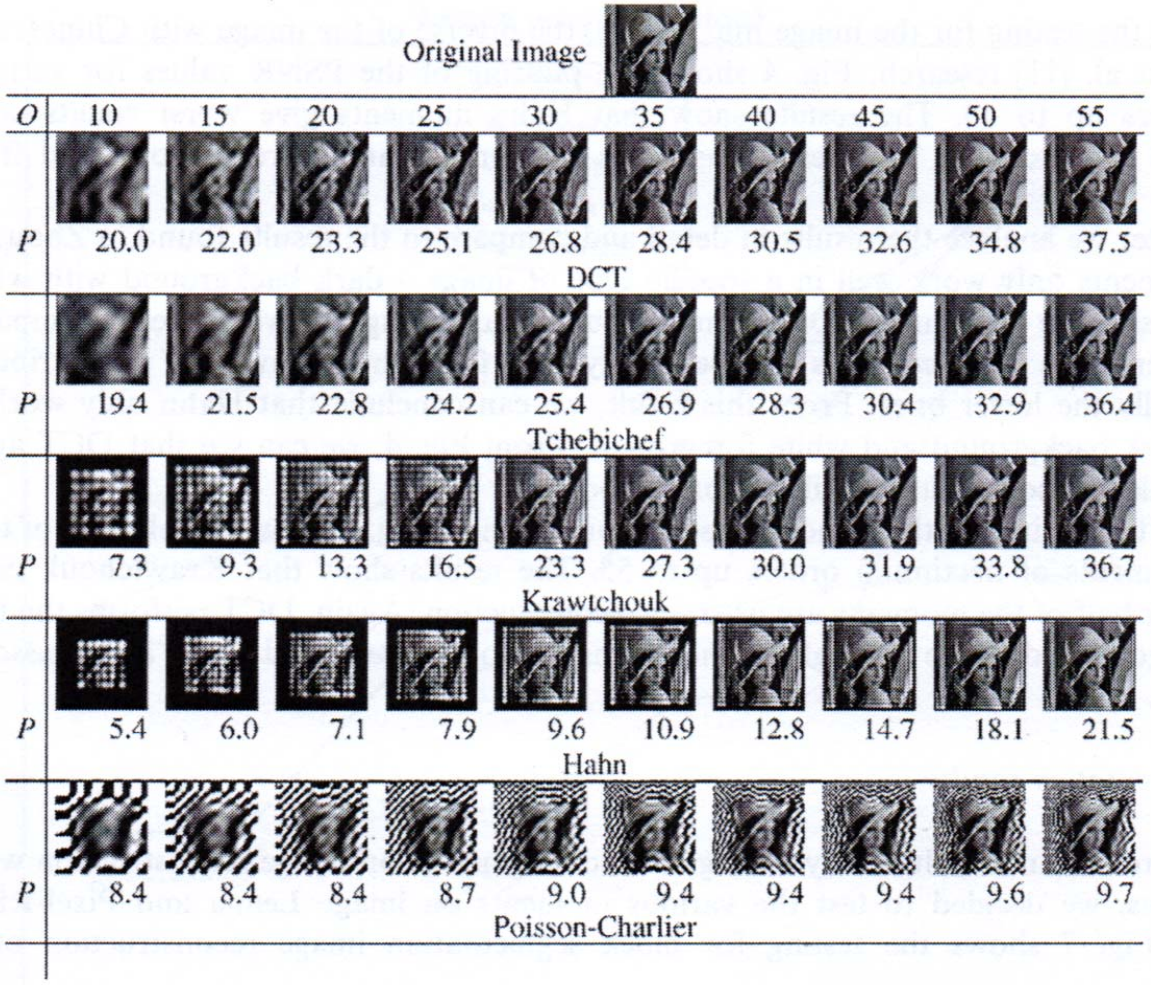


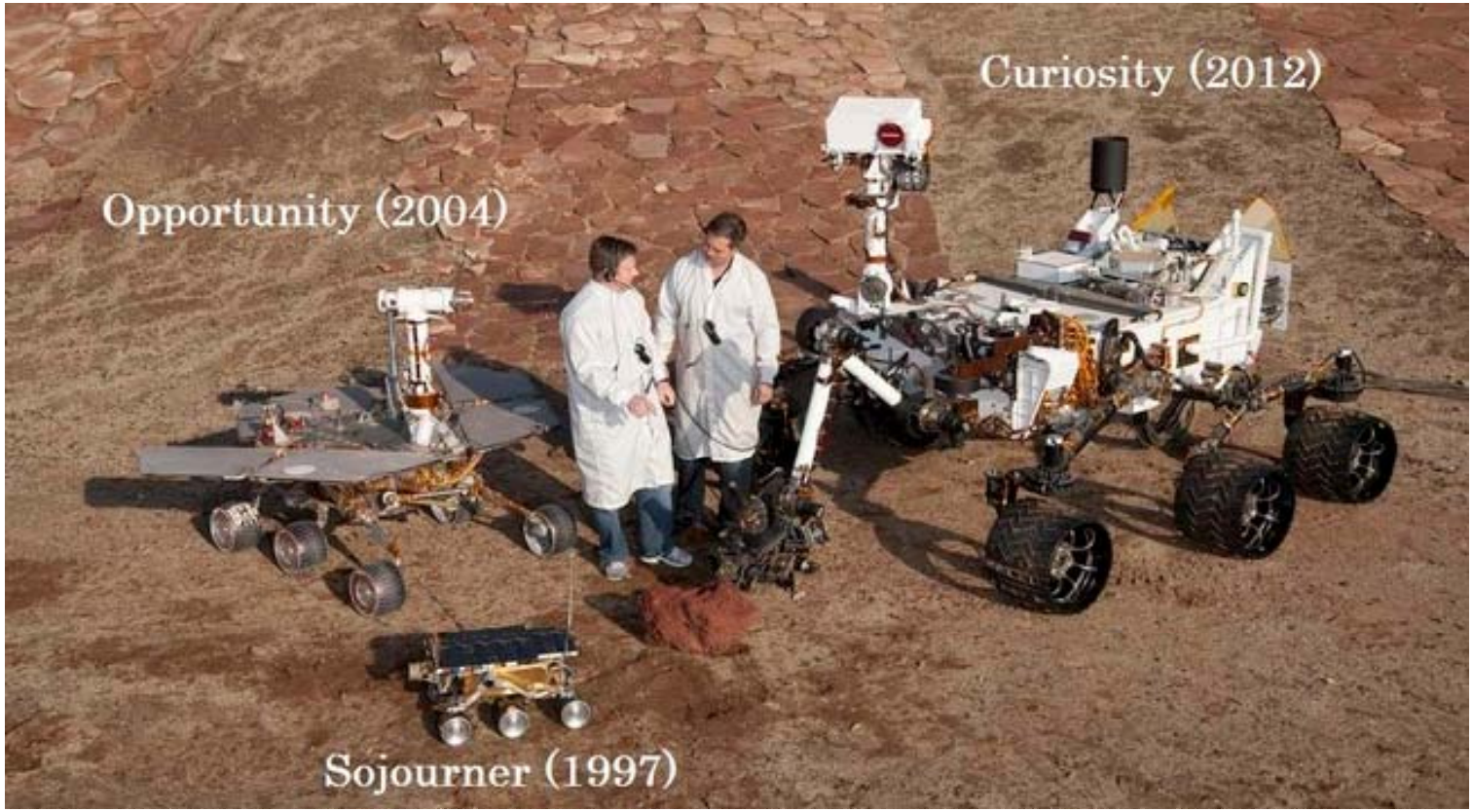
Fig. 1. Image reconstruction of the letter "E" (grayscale 30 × 30) from orders 2 to 28, with the PSNR val

II. Compressão de Informação
Imagens



5. Image reconstruction of the image Lenna (grayscale 64 × 64) from orders 10 to 55, with the PSNR va

II. Compressão de Informação
Telecomunicações



II. Compressão de Informação
Telecomunicações

Pôr do sol em Marte (Spirit)
Credits: NASA/JPL

II. Compressão de Informação
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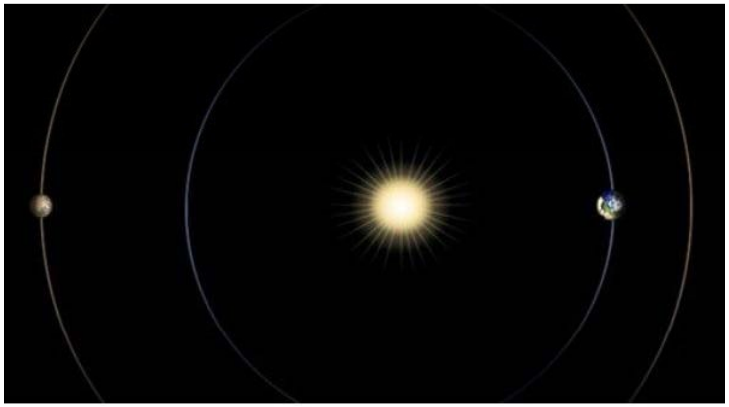

NASA Deep Space Network
(http://deepspace.jpl.nasa.gov/dsn/)

1. **Goldstone, Estados Unidos (desierto de Mojave)**
2. **Canberra, Australia**
3. **Robledo de Chavela, Madrid (Espanha)**

II. Compressão de Informação
Telecomunicações


US007249153B2

(12) **United States Patent**
Cheng et al.

(10) **Patent No.: US 7,249,153 B2**
(45) **Date of Patent: Jul. 24, 2007**

(54) **DATA COMPRESSION USING CHEBYSHEV TRANSFORM**

(75) Inventors: **Andrew F. Cheng**, Potomac, MD (US); **S. Edward Hawkins, III**, Ellicott City, MD (US); **Lillian Nguyen**, Ellicott City, MD (US); **Christopher A. Monaco**, Silver Spring, MD (US); **Gordon G. Seagrave**, Washington, DC (US)

(73) Assignee: **The Johns Hopkins University**, Baltimore, MD (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 591 days.

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Y. S. Zhu, S. W. Leung, Systolic Array Implementations for Chebyshev Nonuniform Sampling; IEEE; 1992; pp. IV-177 to IV-180; IEEE, New York, New York.

Gerard Leng; Compression of aircraft aerodynamic database using multivariable Chebyshev polynomials; Advances in Engineering Software 28 (1997); pp. 133-141; Elsevier Science Ltd.. Great Britain.

II. Compressão de Informação
Telecomunicações

(22) Filed: **Aug. 1, 2003**

(65) **Prior Publication Data**

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Related U.S. Application Data

(60) Provisional application No. 60/400,326, filed on Aug. 1, 2002.

(51) **Int. Cl.**
G06F 15/00 (2006.01)
G06F 17/14 (2006.01)

(52) **U.S. Cl.** **708/203**; 708/400

(58) **Field of Classification Search** 708/203, 708/400

See application file for complete search history.

(56) **References Cited**

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Primary Examiner—Chuong D. Ngo
(74) *Attorney, Agent, or Firm*—Francis A. Cooch

(57) **ABSTRACT**

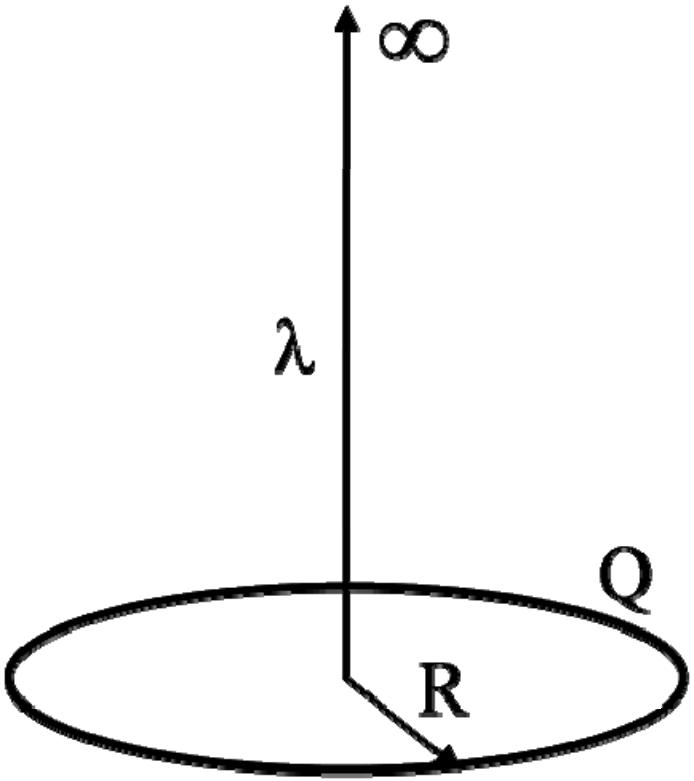
The present invention is a method, system, and computer program product for implementation of a capable, general purpose compression algorithm that can be engaged "on the fly". This invention has particular practical application with time-series data, and more particularly, time-series data obtained form a spacecraft, or similar situations where cost, size and/or power limitations are prevalent, although it is not limited to such applications. It is also particularly applicable to the compression of serial data streams and works in one, two, or three dimensions. The original input data is approximated by Chebyshev polynomials, achieving very high compression ratios on serial data streams with minimal loss of scientific information.

27 Claims, 3 Drawing Sheets

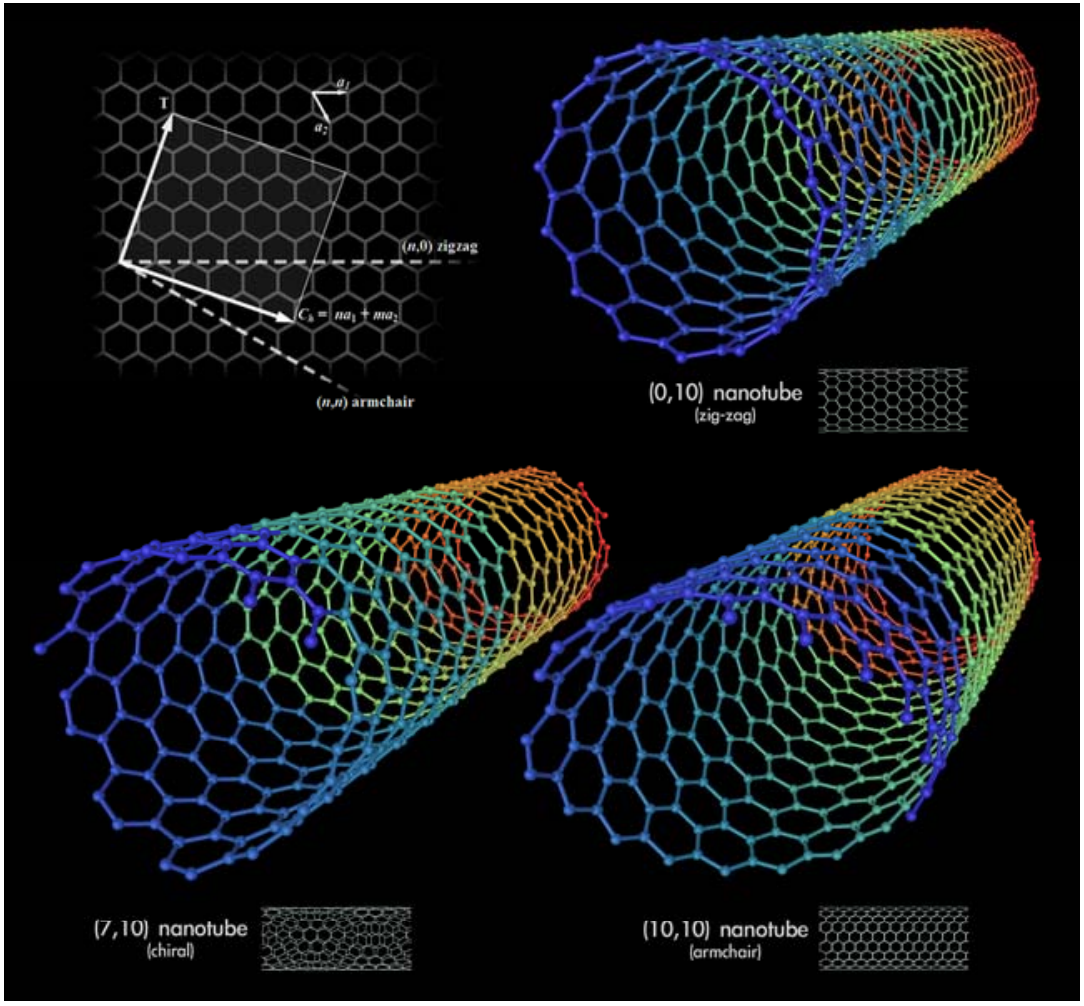
III. Regras de quadratura gaussiana

$$\int f(x)dx \approx \sum_{i=1}^{n} w_i f(x_i)$$

IV. Interpretação eletrostática dos zeros dos polinómios ortogonais



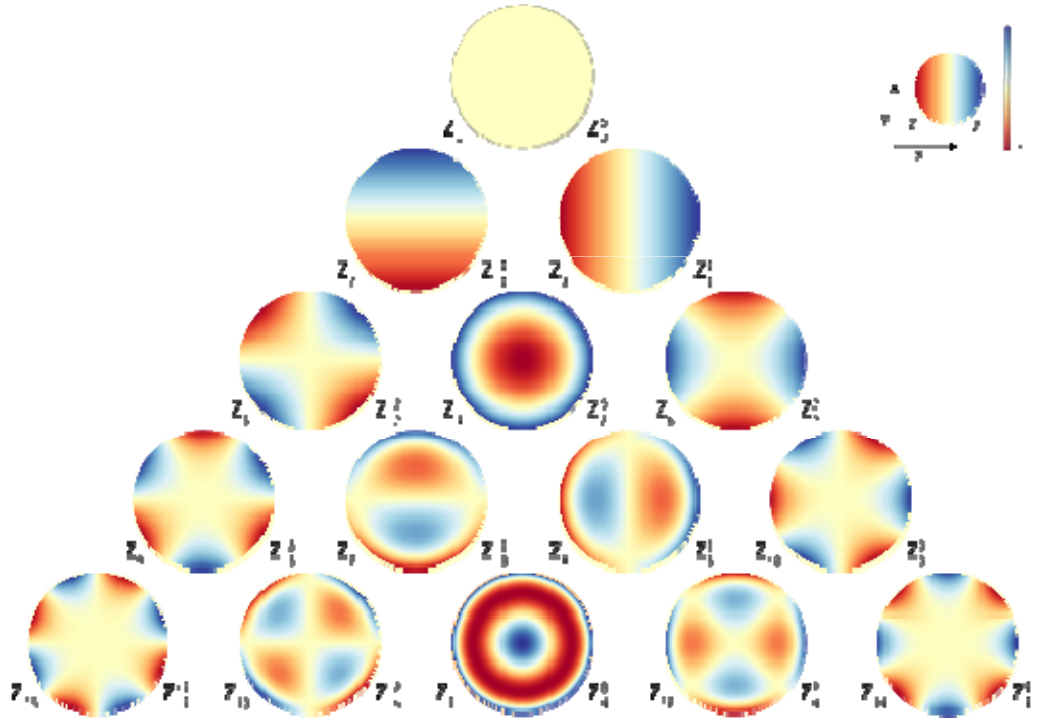
IV. Interpretação eletrostática dos zeros dos polinómios ortogonais -Carbon nanotubes



V. Ótica. Polinómios de Zernike

Applications of Zernike polynomials

The Zernike polynomials are a **basis** defined over the circular support area, typically the pupil planes in classical optical imaging at visible and infrared wavelengths through systems of lenses and mirrors of finite diameter.



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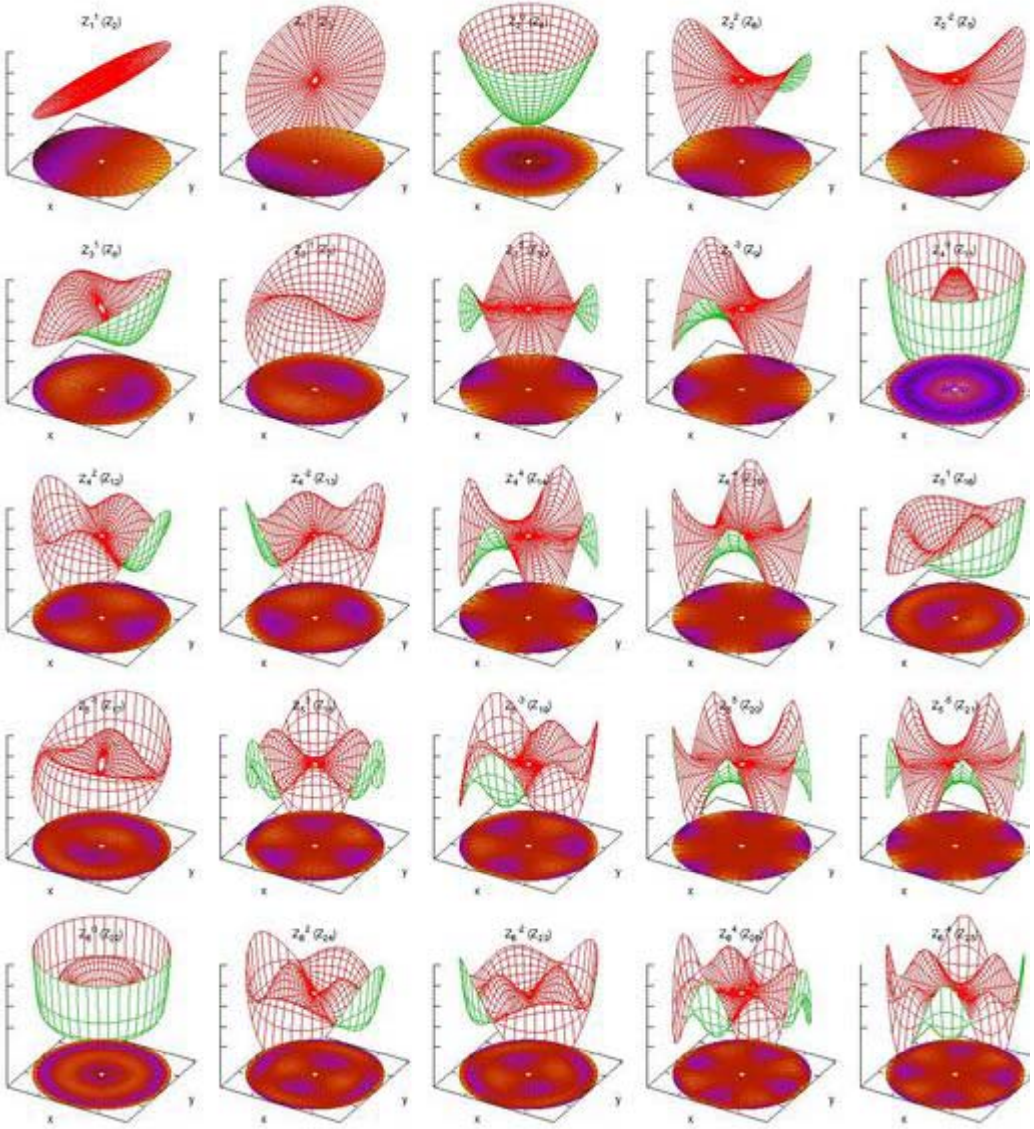
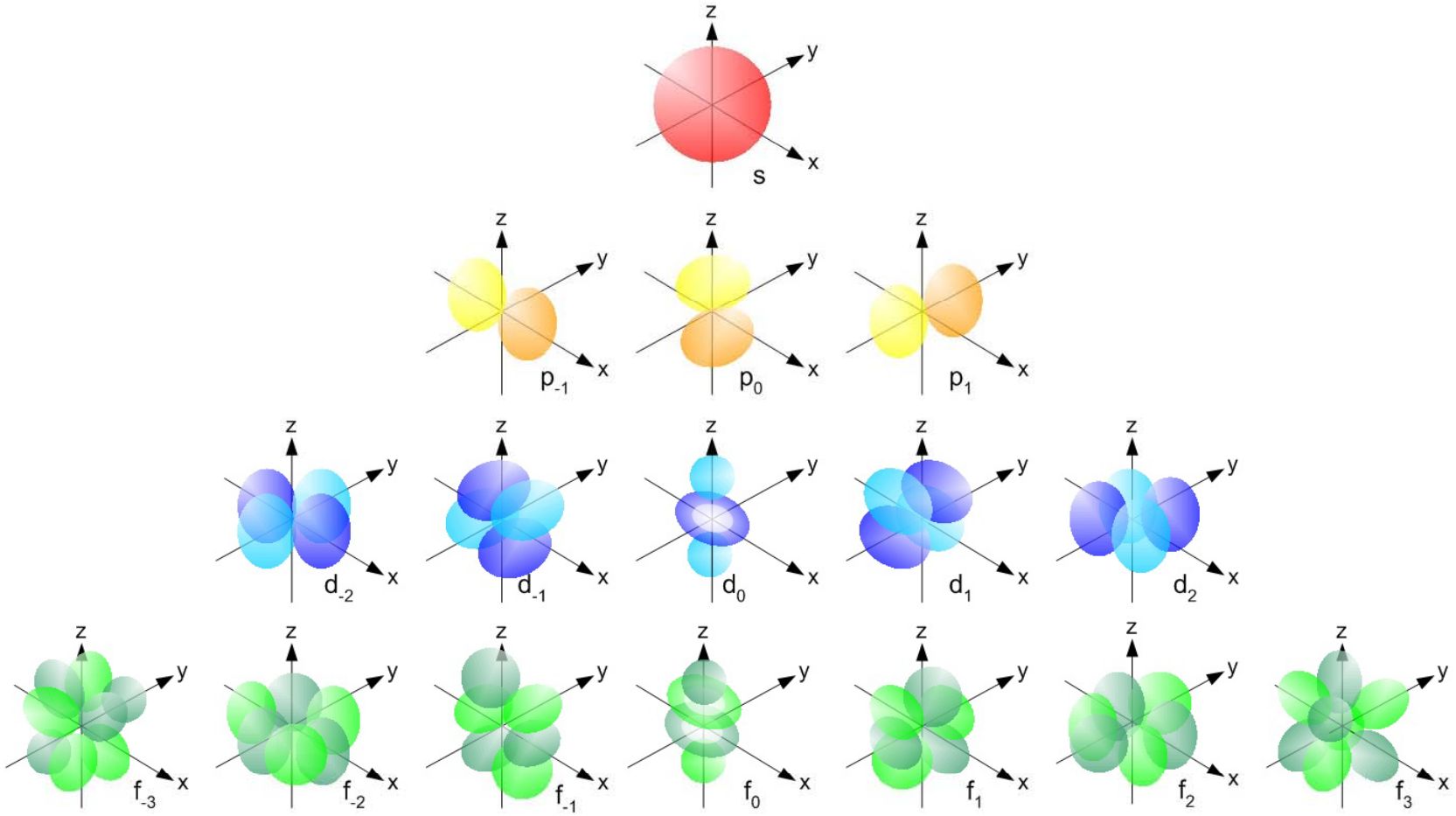


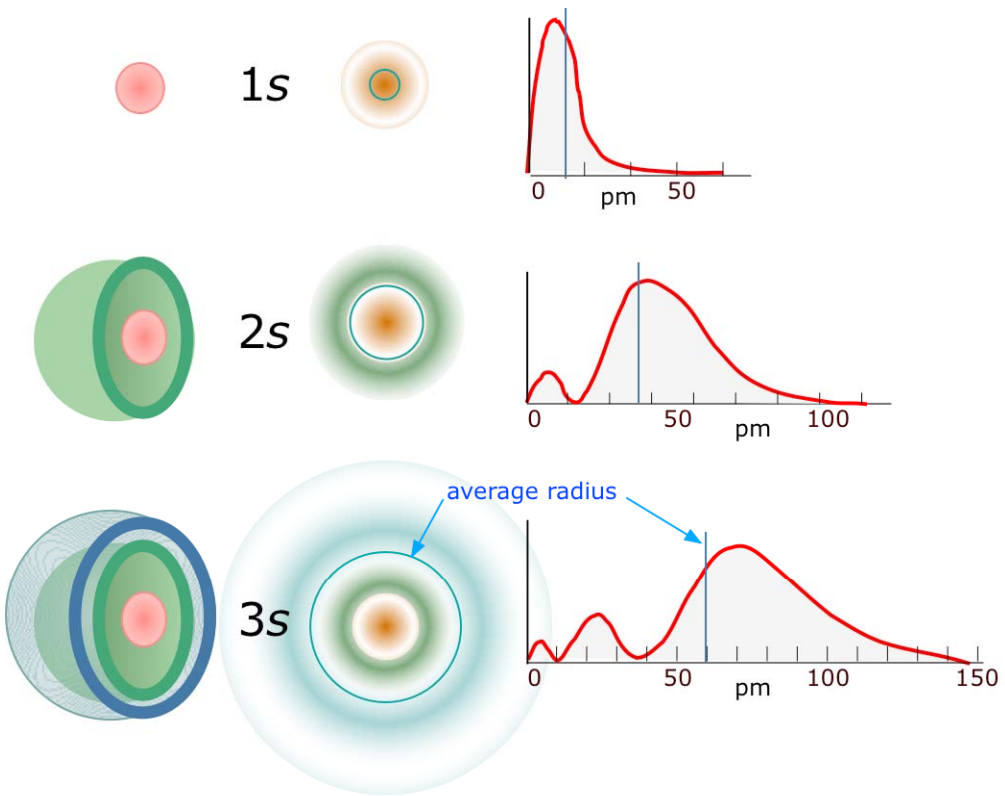
VI. Átomo de hidrogénio

Mecânica quântica - Orbitais atómicos



VI. Átomo de hidrogénio

Mecânica quântica - Orbitais atómicos



VII. Oscilador harmônico quântico
Orbitáis quânticos