

## English Summaries

### ENGLISH SUMMARIES

#### Grant Cairns

*Is there a greater role for prime numbers in our schools?*

Translation of the original paper «Is there a greater role for prime numbers in our schools?», *Australian Senior Mathematics Journal*, 19 (2005), 24-37. The author's contention is that the use of modular arithmetic, a common starting point for many introductory books on number theory, requires some mathematical maturity, out of the reach of many high school students. The object of the paper is to present some elementary ideas concerning number theory, and prime numbers in particular, that can be explored without using congruential notions. These topics could provide a possible subject material for introduction into school curricula.

Keywords: prime numbers, high schools, syllabuses.

MSC2000 Subject Classification: 11A41, 97B10.

---

#### Ramon Codina and Oriol Guasch

*Numerical instability and turbulence: the effect of subscales in fluid mechanics*

In this work we describe two approaches to study the Navier-Stokes equations that, traditionally, have been analyzed independently, but for which there is a natural link: the mathematical description of turbulence in fluid mechanics

and the numerical instabilities encountered when the equations that describe the problem are approximated numerically. In both cases, the objective is to set a problem not for the velocity and pressure of the continuous problem, but for a certain component of these unknowns that can be «captured» in a numerical sense.

Keywords: equations of Navier–Stokes, LES, numerical instability.

MSC2000 Subject Classification: 76D03, 65M12.

---

### **Gabriel Navarro**

*Group algebra: Brauer's problems 1 and 2*

In this note, we introduce  $\mathbb{C}G$ , the complex algebra of a finite group  $G$ , discuss about Brauer's celebrated problems numbers 1 and 2, and finally we propose what we think are the most important challenges on studying  $\mathbb{C}G$ .

Keywords: finite group algebra, character degrees, Brauer's problem number 1, Brauer's problem number 2.

MSC2000 Subject Classification: 20C15.

---

### **Pere Pascual Gainza**

*Geometry of surfaces. A mathematical portrait of Gauss*

Gauss published in 1827 the «Disquisitiones generales circa superficies curvas», a fundamental work in the development of differential geometry since the nineteenth century. The available documentation about the origin and development of the ideas contained in this work allows us to present its main results and to portrait mathematical style and personality of the «prince of mathematics».

Keywords: Gauss, geometry, surfaces.

MSC2000 Subject Classification: 01A55.

---

**Joaquim Puig i Sadurní**

*The ten martini problem: a closed problem*

In this paper we discuss the solution of the «Ten Martini Problem», posed in 1981 in connection with a problem in mathematical physics, which has been recently closed. The problem deals with the Cantor structure of the almost Mathieu operator. We give a brief account of the physical motivations of the problem and discuss its formulations in different settings. We conclude with an outline of the proof.

Keywords: ten martini problem, Cantor set, Schrödinger operator, dynamical systems.

MSC2000 Subject Classification: 11K60, 39A70.

---