

Year: 2016

Vol.: 89

Fasc.: 4

**Title:** Erdős–Surányi sequences and trigonometric integrals

**Author(s):** Liam Baker and Stephan Wagner

We study representations of integers as sums of the form  $\pm a_1 \pm a_2 \pm \dots \pm a_n$ , where  $a_1, a_2, \dots$  is a prescribed sequence of integers. Such a sequence is called an Erdős–Surányi sequence if every integer can be written in this form for some  $n \in \mathbb{N}$  and choices of signs, in infinitely many ways. We study the number of representations of a fixed integer, which can be written as a trigonometric integral, and obtain an asymptotic formula under a rather general scheme due to Roth and Szekeres. Our approach, which is based on Laplace’s method for approximating integrals, can also be easily extended to find higher-order expansions. As a corollary, we settle a conjecture of Andrica and Ionaşcu on the number of solutions to the signum equation  $\pm 1^k \pm 2^k \pm \dots \pm n^k = 0$ .

**Address:**

Liam Baker  
Department of Mathematical Sciences  
Stellenbosch University  
Private Bag X1  
Matieland 7602  
South Africa

**Address:**

Stephan Wagner  
Department of Mathematical Sciences  
Stellenbosch University  
Private Bag X1  
Matieland 7602  
South Africa