

## **IS IT POSSIBLE TO SPIN A TRUCK 90 DEGREES IN A HIGH-RISE FOREST?**

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The subject of our oral presentation is related to the issues of abstract algebra and geometry. We would like to show the problem we have prepared about: “Is it possible to spin a truck 90 degrees in a high-rise forest?”

At the beginning of the presentation, we are to recall a few definitions and statements that are necessary in the process of solving our problem. We are about to start with introducing the concept of modulo  $n$  congruence and its properties.

In the solution, we will use the Chinese Remainders Theorem. The name of the theorem is related to the Chinese mathematician Sun Zi, who around the year 100 AD solved the problem of finding these integers, which when dividing by 3, 5 and 7 respectively give the rests 2, 3. Then we go into discuss the tasks that bring us to find answers. In the first of these we are going to prove that there are 10000001 consecutive natural numbers, none of which is the sum of two squares of integers. Next, we want to consider the episode (truck) of 1995 and the collection of lattice points that are our trees. The next step is to answer the question if our truck is able to turn 90 degrees, avoiding trees in the forest. In the course of our reasoning, we use one of the elementary theorems of Euclidean Geometry - Pythagorean Theorem. We want to present a drawing illustrating of this situation. On the basis of the above reasoning, we will draw the right conclusions and provide answers.

In our speech we will show an interesting application of the concept of abstract algebra in the world around us.

1. *Rutkowski Jerzy*, Algebra abstrakcyjna w zadaniach. — Wydawnictwo Naukowe PWN, Warszawa, 2002.
2. *Gleichgewicht Bolesław*, Algebra. — Oficyna Wydawnicza GiS, Wrocław, 2004.

### **ЧИ МОЖЕМО МИ КРУТИТИ ВАНТАЖІВКУ НА 90 ГРАДУСІВ У ВИСОКОРОСЛОМУ ЛІСІ?**

*Тема нашої роботи пов'язана з китайською теоремою про залишки і принципом її функціонування. У нашій промові ми показуємо, що ця теорема дуже часто використовується для вирішення завдань, пов'язаних з абстрактною алгеброю. Ми вирішимо проблему, підняту в цій темі.*