Case-Application of Chinese Remainder Theorem Plan

Keywords： Chinese Remainder Theorem， history of China， love motherland

Chinese Remainder Theorem：

Let m_1、 m_2、 m_3 be prime to each other a_1、 a_2、 a_3 be integers, there exists an element x， such that

$$x \equiv a_1 \ (mod \ m_1),$$

$$x \equiv a_2 \ (mod \ m_2),$$

$$x \equiv a_3 \ (mod \ m_3),$$

and $x(mod \ m_1m_2m_3)$ is unique.

Teaching Aim:

Introducing the famous Chinese Remainder Theorem. Students will review the long and colorful history of China. Students have ardent love for the motherland. Math is very useful and helpful in every fields.

Case Teaching methodology：

Mathematics, especially, Abstract Algebra is different from other sciences. In chemistry and physics and other laboratory sciences, scientists perform experiments to discover new principles and verify theories. Although mathematics is often motivated by physical experimentation or by computer simulations, it is made rigorous through the use of logical arguments. In studying abstract mathematics, we take what is called an axiomatic approach. These rules are called axioms. Using the axioms for set, we wish to derive other information about numbers by using logical arguments. We require that our axioms be consistent; that is, they should not contradict one another.

Special software is required for calculations involving larger integers which cannot be added directly by the machine. By using the Chinese Remainder Theorem we can

break down large integer additions and multiplications into calculations that the computer can handle directly. This is especially useful on parallel processing computers which have the ability to run several programs concurrently.

In most computer processing, if one can take a large integer and break it down into parts, sending each part to a different CPU, then by performing several additions or multiplications simultaneously on those parts, we can work with an integer that the computer would not be able to handle as a whole.

Chinese Remainder Theorem is a great contribution made by Chinese ancient mathematicians to the development of world mathematics. Its mathematical thought has a wide range of applications and influences in modern mathematics, modern cryptography, code science and daily life. The application of Chinese Remainder Theorem is very wide, such as mathematical fingerprints, UPC code, and a traitor tracing scheme and so on.

Mathematics learning needs to be down-to-earth, step by step. It is necessary to have the spirit of perseverance, perseverance and hard work. Mathematics learning adheres to the principle of serving the motherland, innovating in theory, pursuing excellence, solving frontier problems, integrating theory with practice, and thinking independently.