

## 「数学」の出題の意図

本研究科は、情報理工学の体系的知識を身につけ科学的手法を追究して情報科学技術に関わる研究や開発を主導することのできる人材を養成し、情報理工学の発展に貢献することを目的としています。数学は情報理工学の基底的分野として大変重要であり、体系的な知識を身につけるためには必須の学問です。そのため、本研究科の修士課程で専門分野を学ぶ際に支障が出ないように、入学までに十分な数学の基礎力と数学を十分に活用する能力を身につけておいて欲しいと考えています。そこで、①線形代数、②解析(微分積分、常微分方程式など)、③確率・統計の3分野について、以下に掲げる総合的な数学の基礎力の習得度を判定することを意図して「数学」の問題は出題されました。

### 1) 数学的に思考する力

問題の本質を論理的な思考力で把握・整理し、それらを数学の概念・記法を用いて適切に定式化した上で、その解を正確に導く力

### 2) 数学的に表現する力

自分の考えた道筋を他者が明確に理解できるよう、解答に至る道筋を論理的かつ簡潔に表現する力

### 3) 総合的な数学力

数学を用いて情報理工学の様々な課題を解決するために、数学を自在に活用できると同時に、幅広い分野の知識・技術を統合し、体系的に活用する力

## The purpose of the "Mathematics" problems

The education and research goals at this graduate school are to provide an environment where students can master their systematic knowledge of information science and technology, and to foster individuals who will act as leaders in research and development through the pursuit of the scientific method, thereby contributing to the further development of this field. Mathematics is extremely important as a fundamental field of information science and technology, and is an essential academic subject for acquiring systematic knowledge. Accordingly, we expect students to have acquired sufficient basic mathematical skills and the ability to fully utilize mathematics prior to enrollment, so that they will not encounter difficulties when studying their specialized field in the master's program of our graduate school. Therefore, the "Mathematics" problems were designed to assess the level of mastery of the comprehensive basic mathematical skills listed below in the three fields of (1) linear algebra, (2) analysis (differential/integral calculus, ordinary differential equations, etc.), and (3) probability/statistics.

1) Mathematical Thinking Ability:

The ability to grasp and organize the essence of a problem using logical thinking, appropriately formulate it using mathematical concepts and notation, and accurately derive a solution.

2) Mathematical Expression Ability:

The ability to logically and concisely express the path to a solution so that others can clearly understand the path which you thought.

3) Comprehensive Mathematical Ability:

The ability to use mathematics freely to solve various problems in information science and technology, while also integrating and systematically utilizing knowledge and skills from a wide range of fields.