



東京大学大学院工学系研究科システム創成学専攻

Department of Systems Innovation, Graduate School of Engineering, The University of Tokyo

令和 6 (2024) 年度修士課程・博士後期課程入試・システム創成学関連科目 (専門科目) 課題

Technical Questions on Problems Related to Systems Innovation, 2024 Entrance Examinations for Master's/Doctoral Program

システム創成学関連科目 (専門科目) 課題

Technical Questions on Problems Related to Systems Innovation

- この設問は課題論文に対する理解度、背景となる分野に関する知識、課題の発見・解決能力、研究計画能力、論理的な思考能力を問うものである。学術的な解答を心がけること。

The questions below are to examine your understanding of your assigned paper and knowledge on the academic discipline as well as abilities to find and solve problems, plan research strategies, and think logically. Answers should be written academically.

- 解答に用いる事実・知見等は論文内で提示されているものに限らない (文献名や URL 等の引用元を適切に示すこと)。
Information and/or facts outside your assigned paper can be referred in your answers (properly cite the reference sources, such as bibliographic information and URL, etc.).
- 図表、数式等を適宜用いてもよい。引用する場合は、引用元を明記すること。
Appropriate figures, tables and equations can be used in your answers. If you use materials from other people's properties, cite the original sources properly.
- 1 問につき A4 または US letter 2 頁以内で記述すること。
Answers should be within two pages (A4 or US letter) for each question.
- 解答は日本語または英語で記述すること。
Answers should be written in either English or Japanese.

教員名：米倉 一男

(「志望指導教員の申告票」に記入した第一志望指導教員)

Name of supervisor: Kazuo YONEKURA

(Your most preferred supervisor as in "Declaration of Preferred Supervisors")

以下の論文を読み、下記の3つの問いに答えよ。

Read the publication indicated below and answer the following three questions.

Enrui Zhang, Ming Dao, George Em Karniadakis & Subra Suresh

"Analysis of internal structures and defects in materials using physics-informed neural networks" *Science Advances*, volume 8, eabk0644 (2022)

<https://doi.org/10.1126/sciadv.abk0644>

*上記の論文はシステム創成学専攻や所属教員の特定の意見、立場や考えなどを代表するものではない。

*The above publication does not represent any specific opinion, standpoint or idea of the Department of Systems Innovation or the faculty members.

【問題 1/Question 1】

課題論文の主たる結論について、根拠と論理展開も含めて述べよ。

Explain the main conclusion of your assigned paper including the reasoning and logical flow that led to the conclusion.

【問題 2/Question 2】

課題論文で用いられた主たる手法について説明せよ。また、その手法の利点、独自性、および限界について述べよ。

Explain the main method used in your assigned paper and its advantage, novelty, and limitations.

【問題 3/Question 3】

課題論文の成果に基づいた新技術や新事業の可能性を論ぜよ。

Discuss the possibility of new technology and/or business based on the outcome of your assigned paper.