

Advanced Topics in Geometry A1 (MTH.B405)

Kotaro Yamada

`kotaro@math.sci.isct.ac.jp`

`http://www.official.kotaroy.com/class/2025/geom-a1`

Institute of Science Tokyo

2025/06/06

Notice

- ▶ Today is the final class of MTH.B405.
Thank you for attending and cooperating the course.
- ▶ Please fill the form “Course Survey” in LMS.

Course Survey

The screenshot shows a web browser window with the URL `lms.isct.ac.jp/2025/course/view.php?id=5395&lang=en`. The page is from the Institute of Science Tokyo LMS. The main header includes the university logo, navigation links (Year / Q, Home, Dashboard, My courses), a search bar, and user profile information (KUU). The course title is '幾何学特論A1 / Advanced topics in Geometry A1'. Below the title are tabs for Course, Settings, Participants, Grades, Reports, and a menu icon. The 'General' section is expanded, showing a list of links: Announcement, Syllabus (official), Syllabus as of 11. April 2025, Schedule as of 11. April 2025, Lecture Notes, and Course Survey. A 'Contact/Office hours' section is partially visible at the bottom. On the right side, there is a sidebar with the text 'ttcancelclass' and 'Cancellation notice'.

アカウント

Course: 幾何学特論A1 / 理工学系授業アンケート

lms.isct.ac.jp/2025/course/view.php?id=5395&lang=en

アブリ 器 Tokyo Reading Research Home Radio Tools Money Box CircleSquare OMET

Institute of SCIENCE TOKYO

Year / Q Home Dashboard My courses

Search

KUU

Open course index

2025 / 1

幾何学特論A1 / Advanced topics in Geometry A1

Course Settings Participants Grades Reports ...

General Collapse all

Announcement

Syllabus (official)

Syllabus as of 11. April 2025

Schedule as of 11. April 2025

Lecture Notes

Course Survey

Contact/Office hours

ttcancelclass

Cancellation notice

Q and A

Q: Do we have any example when (g_{ij}, h_{ij}) does not satisfy Gauss equation or Codazzi equation, and show that such surface does NOT exist?

Q: What happens if two symmetric matrices \hat{I} and \hat{II} with components that are real-valued C^∞ -functions on U satisfy only Gauss equation? Or only Codazzi's? Can anything be said about the existence of regular surfaces p with fitting fundamental forms in such cases?

↘ \nexists surface ☹ Gauss & Codazzi
⇔ Integrability
of Gauss-Weingarten

p : surface ν : its unit normal

Gauss-Weingarten:

$$\mathcal{F}_u = \mathcal{F}\Omega, \quad \mathcal{F}_v = \mathcal{F}\Lambda, \quad \mathcal{F} = (p_u, p_v, \nu)$$

Integrability (or compatibility)

$$\Leftrightarrow \mathcal{F}_{uv} = \mathcal{F}_{vu}$$

$$\Leftrightarrow \underline{p_{uv} = p_{vu}, \quad \nu_{uv} = \nu_{vu}}$$

$$\Leftrightarrow \text{Gauss \& Codazzi}$$

Gauss or Codazzi fails \Rightarrow compatibility fails
 \Rightarrow \neq surface