

# AMERICAN JOURNAL OF MATHEMATICS

---

**EDITED BY**

**NITYA R. KITCHLOO**  
JOHNS HOPKINS UNIVERSITY

**WILLIAM P. MINICOZZI II**  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

**FREYDOON SHAHIDI**  
PURDUE UNIVERSITY

**CHRISTOPHER SOGGE**  
JOHNS HOPKINS UNIVERSITY

**WITH THE COOPERATION OF**

C. BIRKAR  
S. KLAINERMAN  
K. SMITH  
M. ZWORSKI

E. FRIEDLANDER  
B. SHIFFMAN  
T. TAO

H. HIDA  
V. SHOKUROV  
S.-T. YAU

*Published under the auspices of*  
**JOHNS HOPKINS UNIVERSITY**

---

**VOLUME 145, NUMBER 3**  
**JUNE 2023**

---



**JOHNS HOPKINS**  
UNIVERSITY PRESS