

**YARIMO‘TKAZGICHLI DIODNING VOLT-AMPER  
XARAKTERISTIKASINI ANIQLASHDA MAPLE DASTURIDAN  
FOYDALANISH**

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**Annotatsiya:** ushbu ishimiz orqali fanlararo o‘zaro boglik va tajriba natijalarini olishda axborot kommunikatsiya texnologiyalaridan unumli foydalanishni ko‘rsatib berish. Dasturning imkoniyatlarini keng ochib berishdan iboratdir.

**Kalit so‘zi:** diod,electron, kovak,volt-amper xarakteristikasi, MAPLE dasturi,yarimo‘tkazgich.

**Using MAPLE to determine the Volt-Ampere characteristics of a semiconductor diode.**

**Annotation:** Through this work, we demonstrate the effective use of information and communication technologies in interdisciplinary interactions and experimental results. It consists of a wide disclosure of the capabilities of the program.

**Keywords:** diode, electron, cavity, volt-ampere characteristic, MAPLE program, semiconductor.

Hozirgi kundagi eng dolzarb muammolardan biri “Energiya tejamliligi va muqobil energiya manbalarini yaratishga doir asboblardan biri quyosh batareyalarining tarkibi yarimo‘tkazgichli diodlardan tashkil topgan . **Diod** deb odatda bir yoki bir necha elektr o‘tishlar va tashqi zanjirga

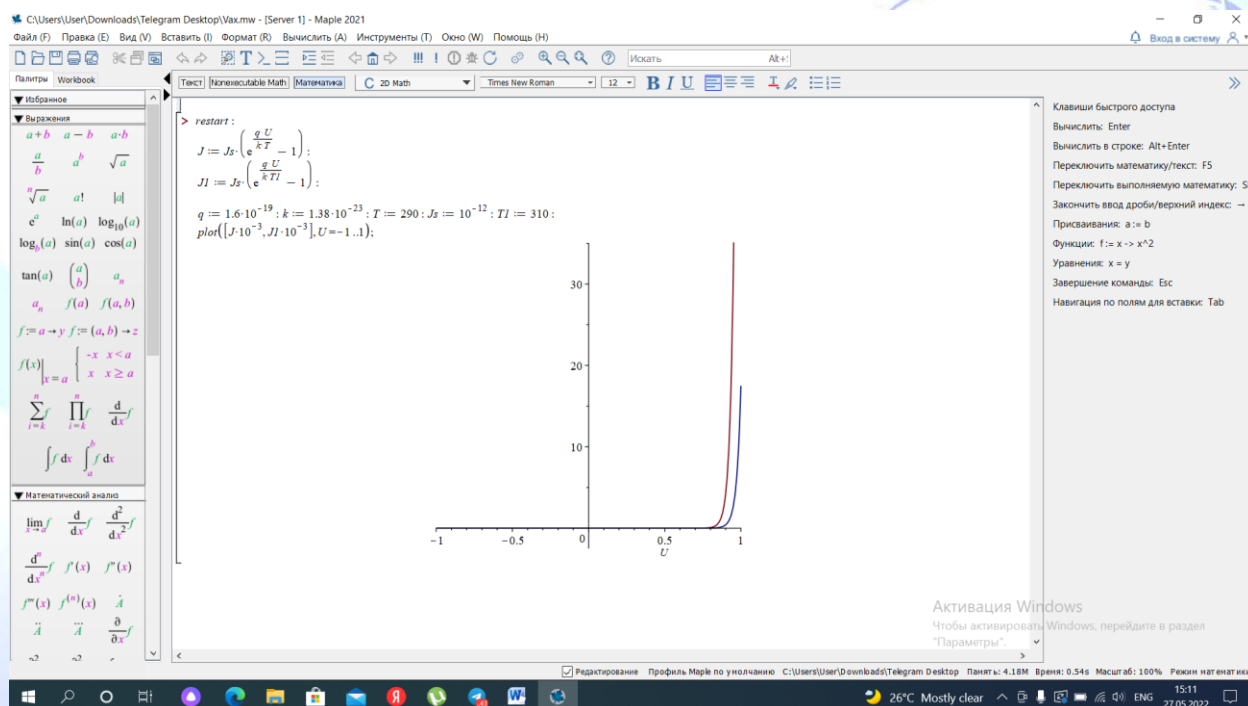
ulanish uchun ikkita chiqishga ega bo‘lgan elektr o‘zgartirgich asbobga aytiladi. Yarim o‘tkazgichli diodlar ma’lumotnomalarda radioelektron apparaturalarda qo‘llanilish sohalari yoki vazifasiga ko‘ra sinflanadilar. Yarim o‘tkazgichli asboblarning ko‘pchiligi bir jinsli bo‘lmagan yarim o‘tkazgichlardan tayyorlanadi. Xususiyl xolatda bir jinsli bo‘lmagan yarim o‘tkazgich bir sohasi p-turdagi, ikkinchisi esa n-turdagi monokristaldan tashkil topadi.

Bunday bir jinsli bo‘lmagan yarim o‘tkazgichning p va n – sohalarining ajralish chegarasida hajmiy zaryad qatlami hosil bo‘ladi, bu sohalar chegarasida ichki elektr maydoni yuzaga keladi va bu qatlam **elektron – kovak o‘tish** yoki **p-n o‘tish** deb ataladi. Ko‘p sonli yarim o‘tkazgichli asboblar va integral mikrosxemalarning ishlash printsiplari p-n o‘tish xossalriga asoslangan.

P-n o‘tish tokining unga berilayotgan kuchlanishga bog‘liqligi  $I=f(U)$  volt–amper xarakteristika (VAX) deyiladi.

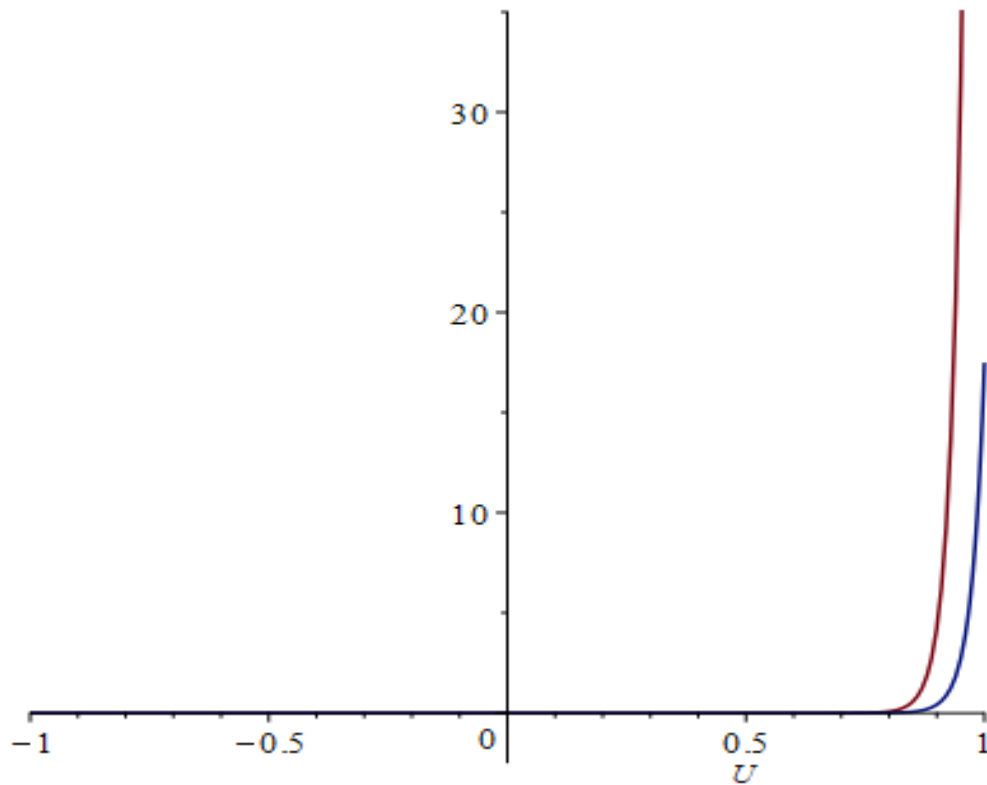
$$I = I_0 \left( e^{\pm \frac{qU_0}{kT}} - 1 \right)$$

ifoda orqali yarimo‘tkazgichli diodning Volt-Amper harakteristikasini grafik tasvirini olishimiz mumkin. Buning uchun MAPLE dasturiga formulamizni kiratamiz va unga kerakli son qiymatlarni beramiz. !!! tugmachasini bosish orqali biz uchun kerakli bo‘lgan formula ya’ni yarimo‘tkazgichli diodning VAX ini olishimiz mumkin . Bundan tashqari dastur yordamida olgan grafigimizga rang berishimiz va turli temperaturalarda turlicha VAX larni bitta grafikda ifodalash ham mumkin.



1-rasm. MAPLE dasturida yarimo‘tkazgichning VAX ni olish.

Bu orqali olinayotgan eksperimental natijalarni nazariy jihatdan ham tekshirish imkoni beradi.



2-rasm. Yarimo‘tkazgichli diodning VAX si.

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