

a) **discont(f,x)** buyrug'i yordamida, bu yerda f – uzluksizligi tekshirilayotgan funksiya, x – o'zgaruvchi. Bu buyruq birinchi va ikkinchi tipdagi uzilish nuqtalarini topish uchun qulaydir.

b) **singular(f,x)**, buyrug'i yordamida, bu yerda f – uzluksizligi tekshirilayotgan funksiya, x – o'zgaruvchi. Bu buyruq o'zgaruvchining haqiqiy hamda kompleks qiymatlari uchun ikkinchi tipdagi uzilish nuqtalarini topish uchun qulaydir.

Ikkala buyruq ham natijani figurali qavslarda uzilish nuqtalarini ketma-ketligi ko'rinishida ifodalaydi. Yozuvning bunday turi set ga tengishli bo'ladi. Olingan uzilish nuqtalarini keyinchalik ishlatish uchun **convert** buyrug'ida set turidan oddiy sonli turga o'tkazish kerak bo'ladi.

1. $y = e^{\frac{1}{x+3}}$ funksiyaning uzilish nuqtalarini toping

```
> readlib(iscont): readlib(discont):
> iscont(exp(1/(x+3)),x=-infinity..infinity);
false
```

Bu ushbu funksiya uzluksizlik emasligini bildiradi. Shuning uchun uzilish nuqtasini quyidagi buyruq orqali topish kerak bo'ladi:

```
> discont(exp(1/(x+3)),x);
{-3}
2. Funksiyaning uzilish nuqtasini toping :
> readlib(singular):
> iscont(tan(x/(2-x)),x=-infinity..infinity);
false
> singular(tan(x/(2-x)),x);
{x = 2}, {x = 2 - \frac{\pi(2\sqrt{2} + 1)}{-2 + 2\sqrt{2}\pi + \pi}}
```

Xulosa va takliflar. Matematik analiz fani bo'yicha turli mavzularga doir qisqacha nazariy ma'lumotlar, namuna sifatida darslikdagi ayrim misollar yechib ko'rsatish, undan tashqari dars o'tish jarayonida amaliy dastur paketlaridan foydalanish oliy ta'lim muassasalarida ushbu fandan amaliy mashg'ulotlarni o'tishda yangi pedagogik texnologiyalarni o'quv jarayoniga joriy etish imkoniyatlarini oshiradi. Bunda talabalar darsda berilgan topshiriqlarni ham qo'lda ham kompyuterda bajarib natijalarni o'zlari solishtirib ko'rishlari mumkin va yechimni to'g'ri yoki xatoligini tekshirib ko'rishlari mumkin. Ushbu ishning asosiy maqsadi talabalarga raqamli texnologiyalardan foydalanib masala yechish usullarini o'rgatish va shu bilan birga talabalarni fanga bo'lgan qiziqishlarini oshirish. Jumladan, Maple dasturlari yordamida qanday matematik masalalarni bajarish mumkinligini namoyish qilib berish. Maple dasturi matematik analiz masalalarini yechishda keng imkoniyatlar bilan ta'minlaydi. Uning yordamida nafaqat hisoblash jarayonlari tezlashtiriladi, balki matematik tushunchalarni chuqurroq tushunish ham mumkin. Bu dastur talabalar, o'qituvchilar va tadqiqotchilar uchun matematik analizni o'rganish va qo'llashda muhim vosita hisoblanadi. Kelajakda Maple kabi dasturlardan foydalanish matematik bilimlarni rivojlantirishda yanada katta rol o'ynaydi.

Ushbu maqola Maple dasturidan foydalanishning afzalliklarini va matematik analiz masalalarini yechishdagi usullarini mantiqiy ketma-ketlikda taqdim etadi. Har bir bo'lim o'zining maqsadiga mos ravishda yoritilgan bo'lib, o'quvchilarga foydali va amaliy bilimlar beradi.

Adabiyotlar

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REZYUME. Ushbu maqolada oliy ta'lim muassasalarida matematika yo'nalishlariga o'tiladigan "Matematik analiz" fanidan ba'zi masalalarini Maple amaliy dasturlar paketida yechish o'rganilgan.

РЕЗЮМЕ. В данной статье исследуется, как решать некоторые задачи дисциплины анализа «Математический анализ», которая преподается на курсах математики в высших учебных заведениях, с использованием прикладного программного обеспечения Maple.

SUMMARY. This article explores how to solve some problems of the discipline "Mathematical Analysis", which is taught in mathematics courses in higher education institutions, using the Maple application software.

THE VALUE OF ENGLISH TECHNICAL LITERATURE IN AVIATION DEVELOPMENT

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Tayanch so'zlar: aviatsiya, sanoat, osonlashtirish, ishlab chiqish, termojuftlar, yong'inni aniqlash.

Ключевые слова: авиация, промышленность, объекты, разработка, термодары, обнаружение пожара.

Key words: aviation, industry, facilitate, development, thermocouples, fire detection.

Introduction. The aviation industry is an inherently global field that requires precise communication and standardized procedures to ensure safety and efficiency.

English, recognized as the international language of aviation, facilitates this communication among pilots, air traffic controllers, engineers, and regulatory bodies. English

technical literature, encompassing regulatory texts, academic publications, technical manuals, and training guides, serves as the backbone for developing and sustaining aviation standards. This paper examines the value of English technical literature in aviation development, focusing on its role in enhancing safety protocols, promoting technological innovation, providing standardized training, and ensuring global regulatory compliance.

Methods. The aviation industry is an inherently global field that requires precise communication and standardized procedures to ensure safety and efficiency. English, recognized as the international language of aviation, facilitates this communication among pilots, air traffic controllers, engineers, and regulatory bodies. English technical literature, encompassing regulatory texts, academic publications, technical manuals, and training guides, serves as the backbone for developing and sustaining aviation standards. This paper examines the value of English technical literature in aviation development, focusing on its role in enhancing safety protocols, promoting technological innovation, providing standardized training, and ensuring global regulatory compliance.

The exact percentage of English-based technical literature in the world is challenging to pinpoint due to the vast and diverse nature of global publications, including books, research papers, regulatory documents, technical manuals, and other forms of technical literature. However, English is the most dominant language in several key domains of literature and academia. Here are some estimates:

Scientific and Technical Literature

About 90% of all scientific and technical journals are published in English. English is the predominant language for academic research, especially in fields like medicine, engineering, aviation, and technology.

Global Book Publishing

English-language books account for roughly 25-30% of all published books globally. While English dominates in terms of academic and technical publications, other languages like Mandarin, Spanish, and French also have significant shares, especially for fiction, cultural, and regional works

International Standards and Regulations

In specific industries like aviation, English is the primary language for standards, manuals, and regulatory literature. Organizations such as ICAO and ISO publish most of their documentation in English to ensure accessibility and standardization worldwide.

English is the most widely used language on the internet, accounting for around 60% of web content. This includes online journals, e-books, and other forms of literature.

Here are some excerpts from aviation publications issued in English.

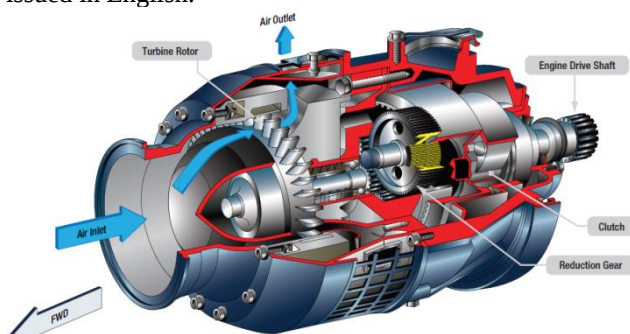


Figure 1. Cutaway view of an air turbine starter.

Air Turbine Starter System Troubleshooting Procedures		
Trouble	Probable Cause	Remedy
• Starter does not operate (no rotation).	• No air supply • Electrical open in cutout switch • Sheared starter drive coupling • Internal starter discrepancy.	• Check air supply. • Check switch continuity. If no continuity, remove starter and adjust or replace switch. • Remove starter and replace drive coupling. • Remove and replace starter.
• Starter will not accelerate to normal cutoff speed.	• Low starter air supply • Starter cutout switch set improperly • Valve pressure regulated too low • Internal starter malfunction.	• Check air source pressure. • Adjust rotor switch actuator. • Replace valve. • Remove and replace starter.
• Starter will not cut off.	• Low air supply • Rotor switch actuator set too high • Starter cutout switch shorted	• Check air supply. • Adjust switch actuator assembly. • Replace switch and bracket assembly.
• External oil leakage.	• Oil level too high • Loose vent, oil filler, or magnetic plugs • Loose clamp band assembly.	• Drain oil and re-service property. • Tighten magnetic plug to proper torque. • Tighten vent and oil filler plugs as necessary and lock wire. Tighten clamp band assembly to higher torque.
• Starter runs, but engine does not turn over.	• Sheared drive coupling.	• Remove starter and replace the drive coupling. If couplings persist in breaking in unusually short periods of time, remove and replace starter.
• Starter inlet will not line up with supply ducting.	• Improper installation of starter on engine, or improper indexing of turbine housing on starter.	• Check installation and/or indexing for conformance with manufacturer's installation instructions and the proper index position of the turbine housing specified for the aircraft.
• Metallic particles on magnetic drain plug.	• Small fuzzy particles indicate normal wear. • Particles coarser than fuzzy (chips, slivers, etc.) indicate internal difficulty.	• No remedial action required. • Remove and replace starter.
• Broken nozzle vanes.	• Large foreign particles in air supply.	• Remove and replace starter and check air supply filter.
• Oil leakage from vent plug assembly.	• Improper starter installation position.	• Check installed position for levelness of oil plugs and correct as required in accordance with manufacturer's installation instructions.
• Oil leakage at drive coupling.	• Leaking rear seal assembly.	• Remove and replace starter.

Figure 2. Air turbine starter system troubleshooting procedures table.

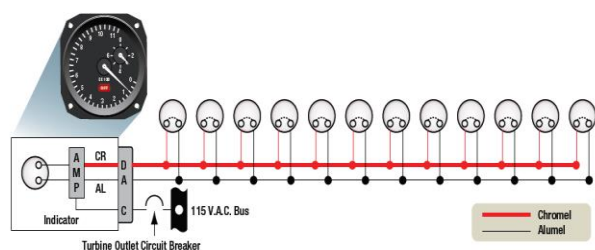


Figure 3. A typical exhaust gas temperature thermocouple system.

Multiple thermocouples are utilized to monitor EGT, TIT, or other specified temperature parameters. These sensors are strategically positioned at intervals around the outer edge of the engine turbine casing or exhaust duct. The small voltage signals generated by the thermocouples are usually amplified and used to power a servomotor, which moves the indicator pointer. It is common practice to link a digital drum display to the pointer's movement through a gearing mechanism.

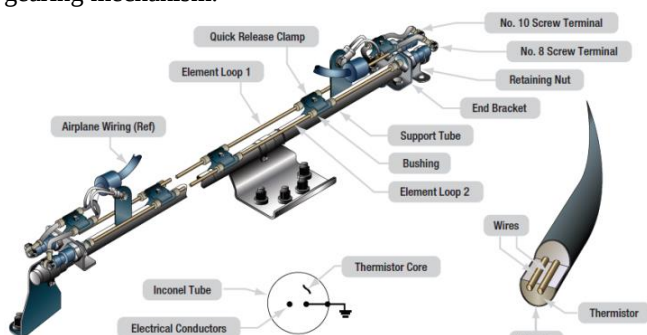


Figure 4. Kidde continuous-loop system.

The analog signal from the thermistor sensor allows the control circuits to provide a two-tiered response within the same sensing loop. The first response is an overheat warning, triggered at a temperature lower than the fire warning threshold. This indicates a general increase in engine compartment temperature, potentially caused by leaking hot bleed air or combustion gases. It serves as an early fire warning, prompting the crew to take action to lower the compartment temperature. The second response occurs at a temperature exceeding what could result from leaked hot gases, signaling an actual fire warning.

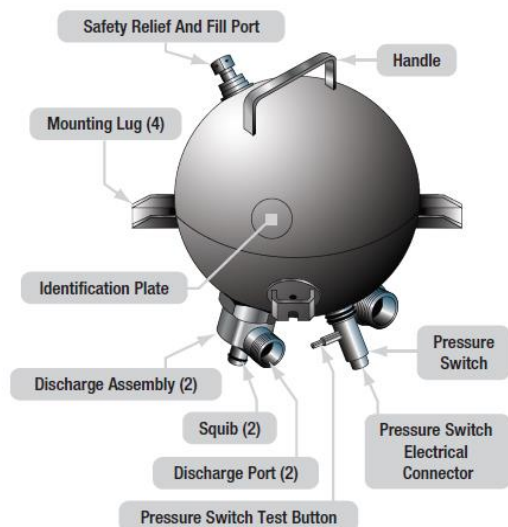


Figure 5. Engine fire detection system functional description.

RESULTS.

1. Enhancement of Safety Standards

The analysis revealed that English literature, particularly regulatory documents and safety manuals, plays a crucial role in ensuring and improving safety standards across the aviation industry. Documents published by ICAO in English, such as safety protocols, operational guidelines, and accident analysis reports, provide a unified framework for maintaining consistent safety practices worldwide. The availability of these documents in English ensures that pilots, air traffic controllers, and maintenance personnel have a common reference for safety standards, regardless of their geographical location.

2. Advancement of Technological Innovation

The study also highlighted that English literature is essential for disseminating technological knowledge and developments in aviation. Technical manuals from leading aircraft manufacturers like Boeing and Airbus are exclusively published in English, ensuring that engineers and technicians worldwide have access to accurate and up-to-date information.

Journals and academic publications in English, such as the *Journal of Aviation Technology and Engineering*, play a critical role in advancing knowledge in aerodynamics, avionics, propulsion systems, and materials science. The global reach of these journals allows researchers from various countries to collaborate, accelerating technological advancements in the field.

3. Standardized Training for Pilots and Air Traffic Controllers

English literature is central to the standardization of training programs for pilots and ATCs. The research found that English-language manuals, flight operation guides, and simulation exercises provide a consistent training approach, which is crucial for safety and operational efficiency.

Let's consider the pilot training manuals. English-language training resources ensure that pilots from different countries follow standardized procedures and communicate effectively in the cockpit. This standardization is essential for maintaining safety during international flights, where effective communication with ATCs is required.

4. Global Standardization and Regulatory Compliance

The research demonstrated that English literature is the foundation for global regulatory compliance and standardization in aviation. Regulatory bodies like ICAO, FAA, and EASA publish all their guidelines, operational standards, and airworthiness directives in English, ensuring that operators worldwide adhere to uniform practices.

Conclusion. The findings show that English literature is indispensable in the development and evolution of the aviation industry. The dominance of English as the international language of aviation, supported by comprehensive literature, ensures that aviation professionals worldwide follow standardized practices, adhere to safety protocols, and access cutting-edge technological knowledge. The uniformity provided by English literature reduces discrepancies in operations, minimizes communication errors, and ensures a cohesive global aviation system.

Furthermore, English-based training materials and technical manuals create a level playing field for professionals from diverse linguistic and cultural

backgrounds, allowing them to work together seamlessly in international contexts. The collaboration fostered through English-language publications and academic research accelerates the pace of technological advancement, ultimately contributing to the industry's growth. And finally, it was concluded that English-based literature was designed with taste.

Abbreviations.

The list below provides a brief explanation of various abbreviations used in this paper.

- International Civil Aviation Organization (ICAO)
- National Transportation Safety Board (NTSB)
- Federal Aviation Administration (FAA)
- European Union Aviation Safety Agency (EASA)
- Air Traffic Controllers (ATC)
- Safety Management Systems (SMS)
- NTSB (The National Transportation Safety Board)
- ISO (International Organization for Standardization).

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REZYUME. Maqolada inglizcha texnik adabiyotlarining aviatsiyadagi ahamiyati, uchuvchilar, muhandislar va tadqiqotchilarga bilimlarni chuqur o'zlashtirish va texnik qo'llanmalarni tushunishda yordam berish ta'kidlangan. U ingliz tilini global aviatsiya tili sifatida ta'kidlab, samarali muloqot va bilimlarni uzatishni ta'minlashini bayon etadi.

РЕЗЮМЕ. В статье подчеркивается роль английской технической литературы в авиации, помогающей пилотам, инженерам и исследователям в глубоком приобретении знаний и понимании технических руководств. В ней подчеркивается глобальность английского языка обеспечивающий эффективную коммуникацию и передачу знаний.

SUMMARY. The article highlights the role of English technical literature in aviation, aiding pilots, engineers, and researchers in deeply acquiring knowledge and understanding technical manuals. It emphasizes English as the global language of aviation, ensuring effective communication and knowledge transfer.

ЎПИВАЙЎ ҺАМ ҚУРАМАЎ МОДУЛЛАР БОЙЎНША ЖОҚАРЎ ДАРЕЖЕЛИ САЎСТЎРЎЛАРДЎ ШЕШЎУСЎЛАРЎ

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Tayanch so'zlar: yuqori tartibli taqqoslamalar, tub modul bo'yicha yuqori tartibli taqqoslamalar, murakkab modul bo'yicha yuqori tartibli taqqoslamalar, taqqoslamalarning tartibini pasaytirish, taqqoslamaning bir xilligi haqida, ko'phadni berilgan modul bo'yicha ko'paytuvchilarga ajratish.

Ключевые слова: сравнения высших степеней, сравнения высших степеней по простому модулю, сравнения высших степеней по составному модулю, понижение степени сравнения, об однородности сравнения, разложение многочлена на множители по заданному модулю.

Key words: higher-order comparisons, higher-order comparisons by simple modules, higher-order comparisons by complex modules, lowering the degree of comparisons, about the homogeneity of comparisons, factoring polynomials by a given modulus.

Kirisiw. Ўпиwayı modul boyınsha joqarı dárejeli salıstırıwdıń ulıwma túrı:

$$f(x) = a_0x^n + a_1x^{n-1} + \dots + a_n \equiv 0 \pmod{p} \quad (1)$$

kórinisinde boladı. Bunda p – ápiwayı san, $a_0 \not\equiv 0 \pmod{p}$, n – pútin teris emes san hám de koefficientleri pútin sanlar. (1) túrindegi salıstırıwlar teoriyasınan bazı bir teoremalardı keltireyik [1-5].

Teorema. (Salıstırıwlar dájeresin páseytiw haqqında). (1) túrindegi salıstırıwdı $n \geq p$ bolǵanda dájeresi $p-1$ den joqarı bolmaǵan, berilgen salıstırıw menen teń kúshli bolǵan $R(x) \equiv 0 \pmod{p}$ salıstırıwǵa almasırwǵa boladı. Bunda $R(x)$ degenimiz $f(x)$ tı $x^p - x$ qa bólgende alıńǵan qaldıq.

Teorema. (Salıstırıwdıń birdeyligi haqqında). Eger (1) túrindegi salıstırıwdı p modul boyınsha bir-biri menen salıstırılmaıtuǵın $\alpha_1, \alpha_2, \dots, \alpha_k$ sanları qanaatlandıratuǵın bolsa, $n \leq p-1$ onda

$$f(x) \equiv (x - \alpha_1)(x - \alpha_2) \dots (x - \alpha_k) \cdot f_k(x) \pmod{p} \quad (2)$$

birdeylilik salıstırıwı orınlı, yamasa buni basqasha aytqanda, (1) salıstırıw

$$(x - \alpha_1)(x - \alpha_2) \dots (x - \alpha_k) \cdot f_k(x) \equiv 0 \pmod{p} \quad (3)$$

salıstırıwı menen teń kúshli, $f_k(x)$ tıń dájeresi $n - k$ bolǵan kópazǵalı.

(3) salıstırıwdıń sol jaǵın berilgen p modul boyınsha $f(x)$ tı kóbeytiwshilerge jiklew dep te ataydı.

Eskertiw. Kópazǵalı berilgen modul boyınsha kóbeytiwshilerge jiklew $f(x) = 0$ teńlemesiniń korenleri boyınsha algebralıq jiklew emes.

Nátiye. Eger $k = n$ bolsa, onda (2) salıstırıwı $f(x) \equiv a_0(x - \alpha_1)(x - \alpha_2) \dots (x - \alpha_n) \pmod{p} \quad (2')$ salıstırıwı menen, al (3) salıstırıwı

$$a_0(x - \alpha_1)(x - \alpha_2) \dots (x - \alpha_n) \equiv 0 \pmod{p} \quad (3')$$

salıstırıwı menen teń kúshli.