

UNIVERZITET U SARAJEVU  
PRIRODNO-MATEMATIČKI FAKULTET  
ODSJEK ZA FIZIKU

NASLOV  
PODNASLOV

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# 1 Naslov

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## 1.1 Podnaslov

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### 1.1.1 Podpodnaslov

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## 2 Primjeri

### 2.1 Slika

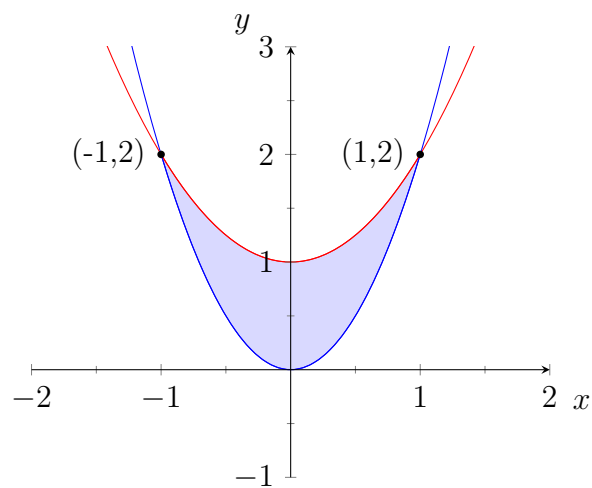


Slika 2.1: Logo PMF koji nije Word 2003 clip art.

### 2.2 Zadatak

**Zadatak 1** Izračunati integral  $I$  ako je  $D$  oblast ograničena sa  $y_1 = 2x^2$ ,  $y_2 = 1 + x^2$ .

$$I = \iint_D (x + 2y) \, dx \, dy.$$



Slika 2.2: Slika uz zadatak 1.

Prvi korak je odrediti granice:  $2x^2 = 1 + x^2 \implies x = \pm 1$ . Tačke presjeka su dakle  $(1, 2)$  i  $(-1, 2)$ .

$$x \Big|_{-1}^1, \quad y \Big|_{2x^2}^{1+x^2}.$$

$$\begin{aligned}
I &= \int_{-1}^1 dx \int_{2x^2}^{1+x^2} (x+2y) dy = \int_{-1}^1 dx \left( xy \Big|_{2x^2}^{1+x^2} + 2y^2 \Big|_{2x^2}^{1+x^2} \right) \\
&= \int_{-1}^1 \{x(1+x^2-2x^2) + 2[(1+x^2)^2 - (2x^2)^2]\} dx \\
&= \dots = \frac{32}{15}.
\end{aligned} \tag{1}$$

## 2.3 Tabela

Value 1	Value 2	Value 3
$\alpha$	$\beta$	$\gamma$
1	1110.1	a
2	10.1	b
3	23.113 231	c

Tabela 2.1: Tabela s paketom booktabs.

Opcija `S` poravnava oko decimalne u srednjem stupcu.

## 2.4 Kompleksnija tabela

$m$	$\operatorname{Re}\{\mathfrak{X}(m)\}$	$-\operatorname{Im}\{\mathfrak{X}(m)\}$	$\mathfrak{X}(m)$	$\frac{\mathfrak{X}(m)}{23}$	$A_m$	$\varphi(m) / ^\circ$	$\varphi_m / ^\circ$
1	16.128	8.872	16.128	1.402	1.373	−146.6	−137.6
2	3.442	−2.509	3.442	0.299	0.343	133.2	152.4
3	1.826	−0.363	1.826	0.159	0.119	168.5	−161.1
4	0.993	−0.429	0.993	0.086	0.08	25.6	90
5	1.29	0.099	1.29	0.112	0.097	−175.6	−114.7
6	0.483	−0.183	0.483	0.042	0.063	22.3	122.5
7	0.766	−0.475	0.766	0.067	0.039	141.6	−122
8	0.624	0.365	0.624	0.054	0.04	−35.7	90
9	0.641	−0.466	0.641	0.056	0.045	133.3	−106.3
10	0.45	0.421	0.45	0.039	0.034	−69.4	110.9
11	0.598	−0.597	0.598	0.052	0.025	92.3	−109.3

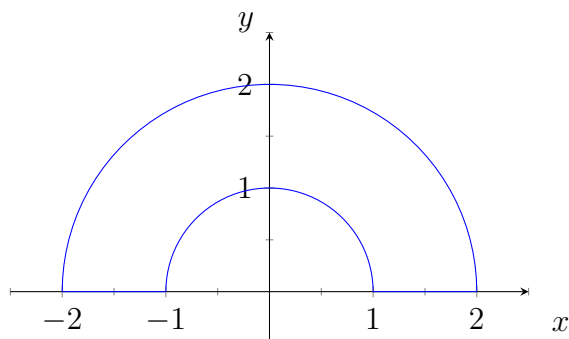
Tabela 2.2: Kompleksna tabela.

## 2.5 Mjerne jedinice

Paket `siunits` dozvoljava da se lako i pravilno pišu veličine koje imaju mjerne jedinice. Kako se često pogrešno radi:  $g = 9.81ms^{-2}$ . Kako je pravilno:  $g = 9.81\text{ m s}^{-2}$ .

## 2.6 Matematika

**Zadatak 2** Izračunati  $\oint y^2 dx + 3xy dy$  na konturi sa slike 2.3.



Slika 2.3: Slika uz zadatak 2.

$$\oint_C P dx + Q dy = \iint \left( \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dx dy$$

$$Q = 3xy, \quad \frac{\partial Q}{\partial x} = 3y$$

$$P = y^2, \quad \frac{\partial P}{\partial y} = 2y$$

$$r \Big|_1^2, \quad \varphi \Big|_0^\pi$$

$$\begin{aligned} \oint_C &= \iint_C (3y - 2y) dx dy = \iint_C y dx dy \\ &= \int_1^2 \int_0^\pi r^2 \sin \varphi dr d\varphi = \frac{r^3}{3} \Big|_1^2 (-\cos \varphi) \Big|_0^\pi = \frac{14}{3}. \end{aligned}$$

**Zadatak 3** Ako je vektorsko polje oblika  $\mathbf{F} = P\mathbf{i} + Q\mathbf{j} + R\mathbf{k}$  dokazati da je  $\text{div rot } \mathbf{F} = 0$ .

$$\begin{aligned} \text{rot } \mathbf{F} &= \left( \frac{\partial R}{\partial y} - \frac{\partial Q}{\partial z} \right) \mathbf{i} - \left( \frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) \mathbf{j} + \left( \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) \mathbf{k} \\ \text{div rot } \mathbf{F} &= \frac{\partial}{\partial x} \left( \frac{\partial R}{\partial y} - \frac{\partial Q}{\partial z} \right) - \frac{\partial}{\partial y} \left( \frac{\partial R}{\partial x} - \frac{\partial P}{\partial z} \right) + \frac{\partial}{\partial z} \left( \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) = 0. \end{aligned}$$

## 2.7 Citiranje i izvori

L<sup>A</sup>T<sub>E</sub>X u sebi sadrži veliki broj alata za citiranje [5]. U fajlu `main.bib` se nalaze primjeri nekoliko citata. Korisno je znati da svaka Wikipedia stranica (uključujući i slike na Wikimedia Commons [3]) ima opciju `Tools->Cite this page`, na kojoj se između ostalog nalazi i Biblatex kod. Dovoljno je samo prekopirati prvi od dva u `main.bib` uz sitne izmjene (npr. “accessed” u “pristupljeno”), te koji vodi na verziju Wikipedije u trenutku citiranja. Slična situacija je i sa arXiv i sl. sajtovima. Ukoliko to nije dostupno, postojeći primjeri se mogu lako preinačiti u nešto korisno. Bitno je napomenuti da u slučaju više autora zarez označava razdvajanje “Prezime, Ime”, dok ključna riječ “and” razdvaja autore. Vidi npr. kod za [2].

## Izvori

- [1] Damir Agačević. *PMF Fizika L<sup>A</sup>T<sub>E</sub>X template*. [Online; pristupljeno 4-januar-2024]. 2021. URL: <https://github.com/theDDA/pmf-fizika-latex-template>.
- [2] Carl M. Bender i Stefan Boettcher. “Real Spectra in Non-Hermitian Hamiltonians Having  $\mathcal{PT}$  Symmetry”. U: *Physical Review Letters* 80.24 (jun 1998.), str. 5243–5246. ISSN: 1079-7114. DOI: 10.1103/physrevlett.80.5243. URL: <http://dx.doi.org/10.1103/PhysRevLett.80.5243>.
- [3] Wikimedia Commons. *File:Porträt des Daniel Bernoulli - edit1.jpg* — *Wikimedia Commons, the free media repository*. [Online; pristupljeno 4-januar-2024]. 2022. URL: [https://commons.wikimedia.org/w/index.php?title=File:Portr%C3%A4t\\_des\\_Daniel\\_Bernoulli\\_-\\_edit1.jpg&oldid=627640203](https://commons.wikimedia.org/w/index.php?title=File:Portr%C3%A4t_des_Daniel_Bernoulli_-_edit1.jpg&oldid=627640203).
- [4] Donald E. Knuth. *The T<sub>E</sub>X Book*. Addison-Wesley Professional, 1986.
- [5] Wikipedia contributors. *LaTeX* — *Wikipedia, The Free Encyclopedia*. [Online; pristupljeno 4-januar-2024]. 2023. URL: <https://en.wikipedia.org/w/index.php?title=LaTeX&oldid=1190763771>.