

UNIVERZITET U SARAJEVU
PRIRODNO-MATEMATIČKI FAKULTET
ODSJEK ZA FIZIKU

NASLOV
PODNASLOV

Student:

Ime Studenta, 1234/F

Profesor:

prof. dr. Ime Profesora

Sarajevo, 2023.

Sadržaj

1	Naslov	3
1.1	Podnaslov	3
1.1.1	Podpodnaslov	3
2	Primjeri	4
2.1	Slika	4
2.2	Zadatak	4
2.3	Tabela	5
2.4	Kompleksnija tabela	5
2.5	Mjerne jedinice	5
2.6	Matematika	6

Popis slika

2.1	Logo PMF koji nije Word 2003 clip art	4
2.2	Slika uz zadatak 1	4
2.3	Slika uz zadatak 2	6

Popis tablica

2.1	Tabela s paketom booktabs.	5
2.2	Kompleksna tabela	5

1 Naslov

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

1.1 Podnaslov

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Nulla porttitor massa id neque aliquam vestibulum morbi blandit. Nunc scelerisque viverra mauris in. Facilisis volutpat est velit egestas dui id ornare. Sollicitudin nibh sit amet commodo nulla facilisi nullam vehicula. Elementum sagittis vitae et leo duis ut diam quam. Lorem sed risus ultricies tristique nulla aliquet enim tortor at. Volutpat odio facilisis mauris sit. At tellus at urna condimentum mattis pellentesque id nibh. A cras semper auctor neque vitae tempus quam pellentesque. Venenatis a condimentum vitae sapien pellentesque habitant. Purus gravida quis blandit turpis cursus in hac habitasse platea. Aenean et tortor at risus viverra. Quisque sagittis purus sit amet volutpat consequat mauris. Sagittis orci a scelerisque purus semper eget duis at tellus. Iaculis urna id volutpat lacus. Urna duis convallis convallis tellus id interdum. Praesent tristique magna sit amet. Netus et malesuada fames ac turpis egestas sed tempus.

In fermentum posuere urna nec. Massa sapien faucibus et molestie ac feugiat sed lectus. Sit amet volutpat consequat mauris. Ac tincidunt vitae semper quis. Platea dictumst quisque sagittis purus. Ultricies leo integer malesuada nunc vel risus commodo viverra. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est. Montes nascetur ridiculus mus mauris vitae ultricies leo integer malesuada. Egestas integer eget aliquet nibh praesent. Quis ipsum suspendisse ultrices gravida. Sociis natoque penatibus et magnis dis parturient montes. Pellentesque diam volutpat commodo sed egestas egestas fringilla phasellus. In mollis nunc sed id semper risus.

1.1.1 Podpodnaslov

Hac habitasse platea dictumst quisque sagittis. Et pharetra pharetra massa massa ultricies mi quis hendrerit dolor. Lectus magna fringilla urna porttitor rhoncus dolor purus non enim. Ac tincidunt vitae semper quis lectus. Sit amet risus nullam eget felis eget nunc lobortis mattis. Nulla pellentesque dignissim enim sit amet venenatis urna cursus eget. Turpis massa sed elementum tempus egestas sed sed risus pretium. Risus feugiat in ante metus dictum at tempor commodo. Posuere morbi leo urna molestie at. Volutpat diam ut venenatis tellus in metus vulputate eu. Pulvinar etiam non quam lacus suspendisse. Molestie a iaculis at erat pellentesque adipiscing commodo. Sed euismod nisi porta lorem.

2 Primjeri

2.1 Slika

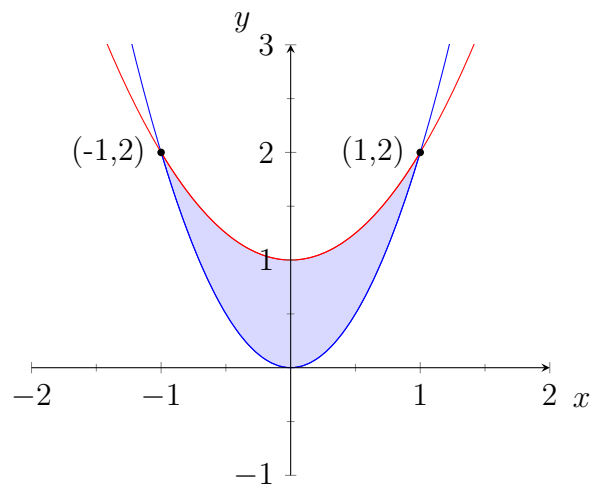


Slika 2.1: Logo PMF koji nije Word 2003 clip art

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
α	β	γ
1	1110.1	a
2	10.1	b
3	23.113 231	c

Tablica 2.1: Tabela s paketom booktabs.

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

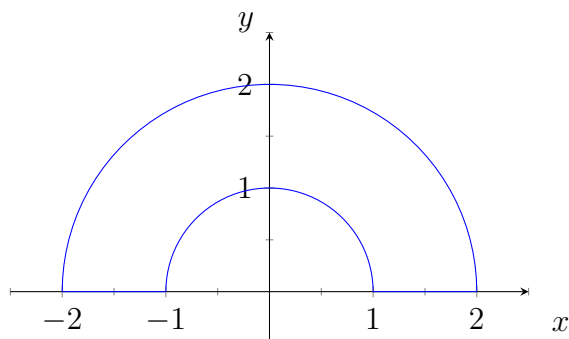
Tablica 2.2: Kompleksna tabela

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 $\text{div rot } \mathbf{F} = 0$.

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