Scientific and Technical Journal of Namangan Institute of Engineering and Technology

Volume 2 | Issue 9 Article 59

2020

# IMPROVING THE QUALITY AND EFFICIENCY OF TEACHING BY DEVELOPING STUDENTS * MATHEMATICAL COMPETENCE USING THE ANIMATION METHOD OF ADDING VECTORS TO THE PLANE USING THE MAPLE SYSTEM

Ergashboy Mirzaboyevich Mirzakarimov
*Ferghana Polytechnic Institute senior teacher*

Jamshid Smoljanovic Fayzullaev
*Ferghana Polytechnic Institute research trainee*

Follow this and additional works at: https://namdu.researchcommons.org/journal

 Part of the Education Commons

## Recommended Citation

Mirzakarimov, Ergashboy Mirzaboyevich and Fayzullaev, Jamshid Smoljanovic (2020) "IMPROVING THE QUALITY AND EFFICIENCY OF TEACHING BY DEVELOPING STUDENTS * MATHEMATICAL COMPETENCE USING THE ANIMATION METHOD OF ADDING VECTORS TO THE PLANE USING THE MAPLE SYSTEM," *Scientific and Technical Journal of Namangan Institute of Engineering and Technology*: Vol. 2: Iss. 9, Article 59.
Available at: https://namdu.researchcommons.org/journal/vol2/iss9/59

This Article is brought to you for free and open access by Scientific and Technical Journal of Namangan Institute of Engineering and Technology. It has been accepted for inclusion in Scientific and Technical Journal of Namangan Institute of Engineering and Technology by an authorized editor of Scientific and Technical Journal of Namangan Institute of Engineering and Technology.

# IMPROVING THE QUALITY AND EFFICIENCY OF TEACHING BY DEVELOPING STUDENTS * MATHEMATICAL COMPETENCE USING THE ANIMATION METHOD OF ADDING VECTORS TO THE PLANE USING THE MAPLE SYSTEM

## Cover Page Footnote

???????

## Erratum

???????

This article is available in Scientific and Technical Journal of Namangan Institute of Engineering and Technology: https://namdu.researchcommons.org/journal/vol2/iss9/59

ISSN:2181-0427

ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ОЛИЙ ВА ЎРТА МАХСУС
ТАЪЛИМ ВАЗИРЛИГИ

# НАМАНГАН ДАВЛАТ УНИВЕРСИТЕТИ ИЛМИЙ АХБОРОТНОМАСИ

# НАУЧНЫЙ ВЕСТНИК НАМАНГАНСКОГО ГОСУДАРСТВЕННОГО УНИВЕРСИТЕТА

2020 йил 9 сон

# MAPLE TIZIMI YORDAMIDA TEKISLIKDA VEKTORLARNI QO'SHISHNING ANIMATSIYA USULIDAN FOYDALANIB TALABALARNING MATEMATIK KOMPETENTLIGINI RIVOJLANTIRISH ORQALI O'QITISHNING SIFAT VA SAMARADORLIGINI OSHIRISH

Mirzakarimov Ergashboy Mirzaboyevich
Farg'ona Politexnika instituti
katta o'qituvchi
Tel:+998906346546
e.mir1401@uzmail.uz
Fayzullayev Jamshid Ismoiljonovich
Farg'ona Politexnika instituti
stajyor tadqiqotchi
Tel: +99893 643 79 80; +99893 643 80 79
E-mail: fayzullayev.75@mail.ru

***Annotatsiya:*** *Ushbu maqolada texnik yo'nalishdagi oliy ta'limda matematika fanini o'qitish sifatini ta'minlash va nazorat qilishda matematik kompetentlikni rivojlantirishning maqsadi faol ochib berilgan, hamda tekislikda vektorlarni qo'shishda animatsiya usulidan foydalanishnig o'rni MAPLE tizimi orqali ko'rsatib berilgan.*

***Kalit so'zlar:*** *kompetentsiya, matematik kompetentlik, ilm-fan,kasbiy faoliyat, kasbiy tayorgarlik,mutaxassis, MAPLE tizimi, tekislikda vektorlar*

# ПОВЫШЕНИЕ КАЧЕСТВА И ЭФФЕКТИВНОСТИ ОБУЧЕНИЯ ЗА СЧЕТ РАЗВИТИЯ МАТЕМАТИЧЕСКОЙ КОМПЕТЕНТНОСТИ СТУДЕНТОВ С ИСПОЛЬЗОВАНИЕМ АНИМАЦИОННОГО МЕТОДА СЛОЖЕНИЯ ВЕКТОРОВ НА ПЛОСКОСТИ С ПОМОЩЬЮ СИСТЕМЫ MAPLE

Мирзакаримов Эргашбой Мирзабоевич
Ферганский Политехнический институт
старший преподаватель
Tel:+998906346546
e.mir1401@uzmail.uz
Файзуллаев Жамшид Исмоилжонович
Ферганский Политехнический институт
стажер-исследователь
Tel: +99893 643 79 80; +99893 643 80 79
E-mail: fayzullayev.75@mail.ru

***Аннотация:*** *В данной статье активно раскрыта цель развития математической компетентности в обеспечении и контроле качества преподавания математики в высшем техническом образовании, а также показана роль использования метода анимации при добавлении векторов на на плоскости через систему MAPLE.*

***Ключевые слова:*** *компетенция, математическая компетентность, наука,профессиональная деятельность, профессиональное мастерство, специалист, система MAPLE , векторы на плоскости*

# IMPROVING THE QUALITY AND EFFICIENCY OF TEACHING BY DEVELOPING STUDENTS ' MATHEMATICAL COMPETENCE USING THE ANIMATION METHOD OF ADDING VECTORS TO THE PLANE USING THE MAPLE SYSTEM

Mirzakarimov Ergashboy Mirzaboyevich
Ferghana Polytechnic Institute
senior teacher
Tel:+998906346546
e.mir1401@uzmail.uz
The Jamshid Fayzullaev Smoljanovic
Ferghana Polytechnic Institute
research trainee
Tel: +99893 643 79 80; +99893 643 80 79
E-mail: fayzullayev.75@mail.ru

***Abstract:*** *in this article, the purpose of developing mathematical competence in the provision and control of the quality of teaching of mathematics in higher education in the technical direction has been actively revealed, as well as the role of using the animation method in the addition of vectors in the plane has been demonstrated through the MAPLE system.*

***Keywords:*** *competence, mathematical competence, science, professional activity, professional skill, specialist, MAPLE system, vectors on the plane*

Zamonaviy mehnat bozori talab qiladigan yuqori malakali mutaxassislarni tayyorlash oliy ta'lim tizimining asosiy vazifasidir. Jamiyat oliy ta'lim sohasida bo'lajak mutaxassislarni tayyorlashda kafolatlarga asoslangan yondashuvni joriy etadi, bu esa har qanday faoliyat sohasidagi mutaxassislarning raqobatdoshligini oshiradi.

Oliy Ta'lim Muassasasining (OTM) bitiruvchilari ishlab chiqarilgan tovarlar va xizmatlarning raqobatbardoshligini ta'minlash uchun zarur bo'lgan bilim va ko'nikmalarga ega bo'lishi kerak. Natijada, talabalarning matematik kompetentligini shakllantirishning eng muhim bosqichi mutaxassisning kasbiy tayyorgarligi bo'lishi mumkin.

Muhandislik mutaxassisliklari talabalarining kasbiy faoliyatga tayyorgarlikning hozirgi bosqichida matematik kompetentlikni rivojlantirishning maqsadi faol hayotiy masalalar yechimlarini shakllantirishni, nafaqat professional mehnat faoliyatini, balki kasbiy muammolarni hal qilishning yangi usullarini kashf qilish bilan bog'liq ijodiy ishlarni ham o'z ichiga oladi. Bu shuni anglatadiki, ta'limning asosiy va yagona maqsadlaridan biri, olingan bilim o'quvchilarning shaxsiyatini rivojlantirish vositasiga aylanadi.

Matematik bilimlarni yanada mustahkam o'rganish uchun talabalarning matematik kompetentligini rivojlantirish bilan maqsadli faol faoliyatini tashkil etish zarur, shuning uchun texnika yo'nalishidagi Oliy Ta'lim Muassasalarida matematik kompetentlikni rivojlantirishning asosiy vazifasi nafaqat talabalarni nazariy bilimlarni ongli ravishda o'rganishga jalb qilish, balki ularni amaliy muammolarni hal qilishda qo'llashning asosiy usullarini o'rgatishdir.

Matematikaning texnik fanlarga qo'llanilishidagi vazifalar, analitik geometriya, vektorlar nazariyasi, funktsiyalarning hosilalari, muayyan va ko'p sonli integrallar, differensial tenglamalar, ehtimollik va statistik usullar texnik masalalrni yechish va tahlil qilishda muhim o'rin tutadi. Ushbu usullar fizika, nazariy mexanika, materiallarning qarshiligi, gidravlika, mashina va mexanizmlar nazariyasi kabi umumiy texnik va amaliy fanlarning ko'plab masalalarini hal qilish uchun yuqori ahmiyatga ega.

Albatda bu yerda talabalarning olingan nazariy va amaliy bilimlaridan o'z mutahassisliklari bo'yicha amaliy foydalana oladigan bo'lishlarini hisobga olib, ustoz pedagoglardan shu ko'rinishdagi masalalarni yechishni o'rgatish talab qilinadi.

Buning uchun matematikani chuqur tushunish, matematik qobiliyatlarni rivojlantirish, matematikaning haqiqiy amaliy muammolarini hal qilishda motivatsiya berish va talabalarda matematik kompetentlikni rivojlantirish talab etiladi. Shunday qilib, matematik muammolarni hal qilish qobiliyatini maqsadli shakllantirish talabalarning matematik kompetensiyalarini samarali shakllantirish shartidir.

Matematik kompetentlikni takomillashtirishning oliy ta'lim jarayoniga texnologik, tizimli, faoliyatli, kompetensiyaviy va innovatsion yondashuvlar asosida yondoshishni taqozo etadi. Matematikani o'qitishda Matlab, Matcad va Maple kabi dasturlar hozirgi kunda o'qitish jarayonida keng qo'llab kelinmoqda. Aytish joizki, bu dasturlar nafaqat fan rivoji, balki ihtisoslik boyicha qanday qilib va qayerda qo'llash kerakligi masalalarini hal qilish bilan birga vaqtdan unumli foydalanishga ham yordam beradi.

Buni Maple tizimida tekislikda vektorlarni qo'shishning animatsiya usulidan foydalanish orqali ko'ramiz.

Tekislikda boshlang'ich va ohirgi nuqtasining koordinatalari berilgan vektorlar ustida amallarni bajarishda Maple tizimining animatsiya usulidan foydalanish qoidalari uchun tuzilgan dasturning tadbiqini quyidagi misollar asosida ko'rsatamiz.

1. $A(2;7)$ va $B(13;33)$ nuqtalarga qurilgan $\overline{AB}$ vektorni $B$ uchidagi nuqtaga ikkinchi $C(4;-7)$ va $D(21;-3)$ nuqtalarga qurilgan $\overrightarrow{ND}$ vektorni animatsiya asosida ko'chirish va bu vektorlarni qo'shish (1–rasm).

M a p l e d a s t u r i

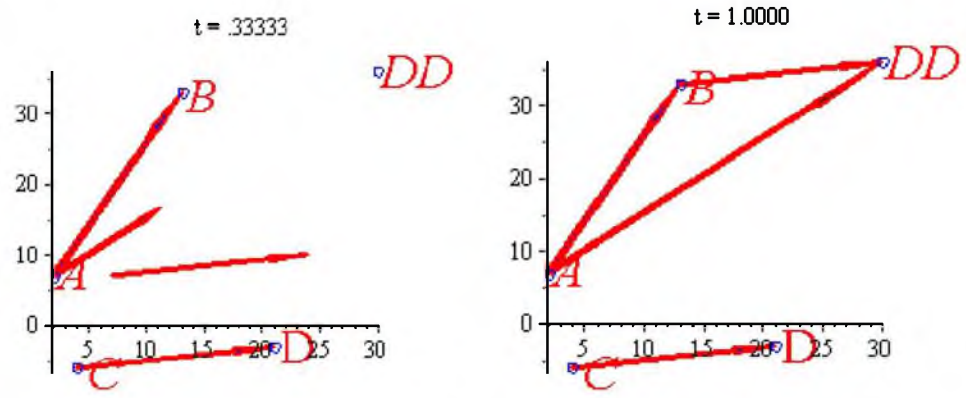
```
> restart; with(plottools):with(plots):#difference,
> x1:=2:y1:=7:x2:=13:y2:=33:x3:=4:y3:=-6:x4:=21:y4:=-3:
> #x1:=-12:y1:=7:x2:=-13:y2:=33:x3:=-4:y3:=-16:x4:=-21: y4:=-13:
    > AB:= arrow(<x1,y1>,<x2,y2>,axes=normal,width=0.36, difference,color=blue);
                                AB := PLOT3D(...)
> CD:= arrow(<x3,y3>,<x4,y4>,axes=normal,width = 0.36, difference,color=blue);
CD := PLOT3D(...)
2 TA VEKTORNI UCHBURCHAK USULDA QO'SHISH :
> ABCD:=animate(arrow,[<x3+(x2-x3)*t,y3+(y2-y3)*t>,
<x4-x3,y4-y3>,width=0.36,axes=normal,color=red],t=0..1);
                                ABCD := PLOT3D(...)
> N1234:=pointplot([[x1,y1],[x2,y2],[x3,y3],[x4,y4], [x2+x4-x3,y2+y4-
y3]],color=[blue,blue,blue,blue,blue], symbol=circle,symbolsize=20):
> NABCD:=textplot([[x1,y1+0.5,'A'],[x2,y2-0.5,'B'], [x3+0.3,y3-0.6,'C'],[x4,y4,'D'],[x2+x4-
x3,y2+y4-y3,' DD']],color=red,align=RIGHT, font=[TIMES,ROMAN,20]);
```

*NABCD := PLOT3D(...)*

> ADD:=animate(arrow,[<x1,y1>,<(x2-x1+x4-x3)*t,
(y2-y1+y4-y3)*t>,width=0.36,axes=normal, color=black], t=0..1);

*ADD := PLOT3D(...)*

> display([AB,CD,ABCD,N1234,NABCD,ADD],color=red, thickness=2);




1–rasm.

2. A(5;7) , B(13;3) , C(4;-6) , D(21;-3) , M(4;9) , N(15;13) nuqtalarga qurilgan $\overline{AB}$ , $\overline{ND}$ , $\overline{MN}$ vektorlarni qo'shish uchun birini ikkinchisi oxiriga parallel ko'chirish bilan $\overline{ADD} = \overline{AB} + \overline{ND} + \overline{MN}$ yig'indi vektorni animatsiya asosida qurish (2-rasm).

M a p l e d a s t u r i

> restart; with(plottools):with(plots):#difference,
> x1:=15: y1:=7: x2:=13: y2:=3: x3:=4: y3:=-6:
x4:=21: y4:=-3: x5:=4: y5:=9: x6:=15: y6:=13:
> AB:= arrow(<x1,y1>,<x2,y2>,axes=normal,width= 0.36, difference,color=blue);

*AB := PLOT3D(...)*

> CD:= arrow(<x3,y3>,<x4,y4>,axes=normal,width= 0.36, difference,color=blue);

*CD := PLOT3D(...)*

> MN:=arrow(<x5,y5>,<x6,y6>,axes=normal,width = 0.36, difference,color=blue);

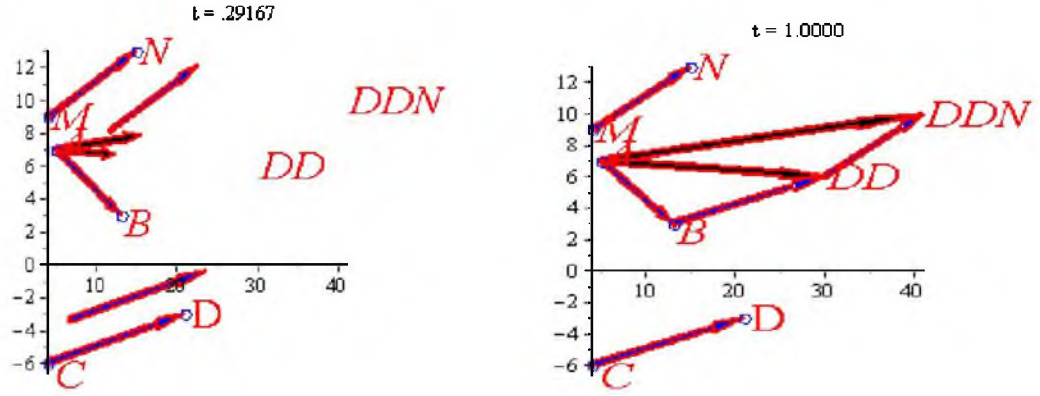
*MN := PLOT3D(...)*

> ABCD:=animate(arrow,[<x3+(x2-x3)*t, y3+(y2-y3)*t>,
<x4-x3,y4-y3>,width=0.36, axes=normal,color=blue], t=0..1); #head_length=1.4,

*ABCD := PLOT3D(...)*

> CDMN:=animate(arrow,[<x5+(x2+x4-x3-x5)*t,
y5+(y2+y4-y3-y5)*t>,<x6-x5,y6-y5>,width=0.36,
axes=normal, color=blue],t=0..1); *CDMN := PLOT3D(...)*
> S1:=animate(arrow,[<x1,y1>,<(x2-x1+x4-x3)*t,
(y2-y1+y4-y3)*t>,width=0.36,axes=normal,color=black], t=0..1); *S1 := PLOT3D(...)*
> S2:=animate(arrow,[<x1,y1>,<(x2+x4-x3+x6-x5-x1)*t, (y2+y4-y3+y6-y5-y1)*t>,width=0.36,
axes=normal, color=black],t=0..1); *S2 := PLOT3D(...)*
> N1234:=pointplot([[x1,y1],[x2,y2],[x3,y3],[x4,y4],
[x5,y5],[x6,y6]],color=[blue,blue,blue,blue,blue, blue],symbol=circle,symbolsize=20):

```
> NABCD:=textplot([[x1,y1+0.5,'A'],[x2,y2-0.5,'B'], [x3+0.3,y3-0.6,'C'],[x4,y4,'D'],[x5,y5,'M'],
[x6,y6,'N'],[x2+x4-x3,y2+y4-y3,'DD'],[x2+x4-x3+x6-x5, y2+y4-y3+y6-y5,'
DDN']],color=red,align=RIGHT,font= [TIMES,ROMAN, 20]);
```
*NABCD := PLOT3D(...)*
```
> display([AB,CD,MN,ABCD,CDMN,S1,S2,N1234,NABCD], color=red,  thickness=2);
```

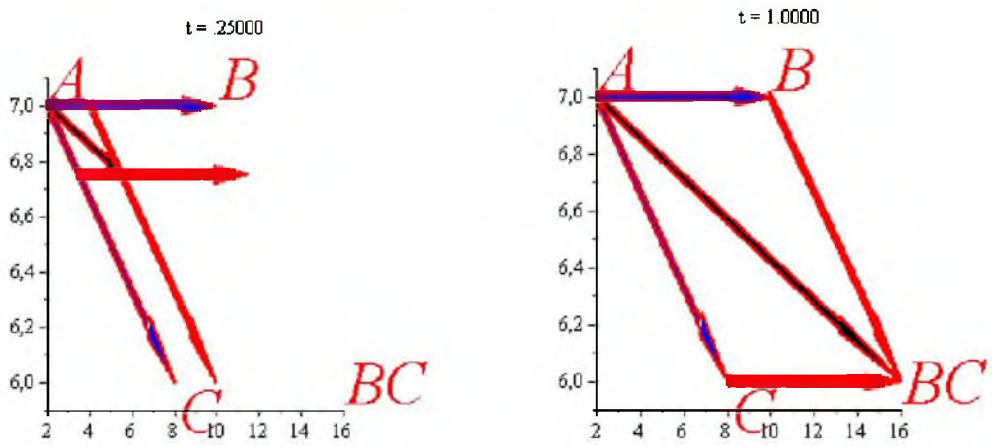



2–rasm.

3. A(2;7), B(10;7), C(8;6) nuqtalarga qurilgan $\overrightarrow{AB}$, $\overrightarrow{AN}$ vektorlarni parallelogram usulida qo‘shishni animatsiya asosida bajarish (3–rasm).

M a p l e  d a s t u r i

```
> restart; with(plottools):with(plots):#difference,
> x1:=2:y1:=7: x2:=10:y2:=7: x3:=8:y3:=6: x4:=12:y4:=3:
> #x1:=12:y1:=7: x2:=20:y2:=7: x3:=28:y3:=6: x4:=22: y4:=3:
> AB:= arrow(<x1,y1>,<x2,y2>,axes=normal,width = 0.03, difference,color=blue);
```
*AB := PLOT3D(...)*
```
> AC:=arrow(<x1,y1>,<x3,y3>,axes=normal,width = 0.04, difference,color=blue);
```
*AC := PLOT3D(...)*
```
> ABAC:=animate(arrow,[<x1+(x2-x1)*t, y1+(y2-y1)*t>,
<x3-x1,y3-y1>,width=0.04, axes=normal,color=red], t=0..1);
```
*ABAC := PLOT3D(...)*
```
> ACAB:=animate(arrow,[<x1+(x3-x1)*t, y1+(y3-y1)*t>,
<x2-x1, y2-y1>,width=0.03, axes=normal,color=red], t=0..1);
```
*ACAB := PLOT3D(...)*
```
> SABAC:=animate(arrow,[<x1,y1>,<(x2+x3-2*x1)*t,(y2+y3-
2*y1)*t>,width=0.03,axes=normal, color=black],t=0..1);
```
*SABAC := PLOT3D(...)*
```
> NAB:=textplot([[x1,y1+0.1,'A'],[x2,y2+0.1,'B'], [x3+0.1,y3-0.1,'C'],[x2+x3-x1,y2+y3-y1,'
BC']], color=red,align=RIGHT,font= [TIMES,ROMAN, 30])
```
*NAB := PLOT3D(...)*
```
> display(AB,AC,ABAC,ACAB,SABAC,NAB,color=red, thickness=2);
```




3–rasm.

Hulosa qilib shuni aytish mumkinki, dars jarayonida oliy ta'limda matematika fanini o'qitish sifat va samaradorligini oshirishni ta'minlash va nazorat qilish xamda talabalarda matematik kompetentlikni rivojlantirish uchun ta'limning zamonaviy metodlaridan va MAPLE tizimidan foydalanish katta ahamiyat kasb etadi. Bunday o'qitish orqali talabalar geometrik masalalarni yechishda vektorlarni qo'shish usullarini annimatsiya usulida ko'rib, tasavvur qilish, shaklini ko'z oldiga keltirish imkoniyatiga ega bo'ladilar.

Asosiy matematik kompetentlikni rivojlantirishda talabaning mavzuni tushunishga, muayyan jamiyat sharoitida shaxsiy va professional hayotda natijalarga erishishga imkon beradigan qobiliyati bo'lib, ular fanni o'zlashtirishda va fanlararo o'zaro munosabatlarda o'qituvchining samarali hamkorligini ta'minlaydi.

Mutaxassislarga matematika fanini o'qitishda matematik kompetentlikni rivojlantirish orqali axborot va pedagogik texnologiya integratsiyasi asosida o'qitish muxandislik, texnik-texnologik va ijtimoiy funksiyalari bilan birgalikda axborot texnologiyalaridan unumli va mutaxassislikka yondoshilgan xolda foydalanishni hamda dars jarayonida chegaralangan vaqtdan samarali foydalanishni taqazo etadi.

Adabiyotlar.

1. 2018 yil 5 iyundagi "Oliy ta'lim muassasalarida ta'lim sifatini oshirish va ularning mamlakatda amalga oshirilayotgan keng qamrovli islohotlarda faol ishtirokini ta'minlash bo'yicha qo'shimcha chora –tadbirlar to'g'risida" PQ-3775 qaror.
http://lex.uz/ru/docs/3765586
2. Ishmuhamedov R.J. Innovatsion texnologiyalar yordamida ta'lim samaradorligini oshirish yo'llari. T.2004
3. Danko R.E. Popov A.G., Kojevnikova G.U. Oliy matematika. Misol va masalalar. IIq,T.:«O'zbekiston",2007y.
4.Матросов А.В. Maple 6. Решение задач высшей математики и механики, СПб.:БХВ-Петербург, 2001г.
5. Mirzakarimov E.M., Oliy matematika masalalarini Maple dasturi yordamida yechish ,3q, T:"Adabiyot uchqinlari", 2015y.
6. A.A.Abduqodirov, F.T.Otabayeva "Ijodiy tasavvur va uni rivojlantirishning intelektual qurollari " Namangan" nashriyoti 2014

46 Қалбимизга яқин одамлар
Тўйчиев А .Х ..... 268
47 Ўзбек тилшунослиги атамалари тарихидан
Бобомуродова Ш Э ..... 272
48 Таржимашуносликда экзотизм тушунчаси ва унинг тавсифи ҳақида
Деҳқонов И. ..... 277

## ПЕДАГОГИКА ФАНЛАРИ
## 13.00.00 ПЕДАГОГИЧЕСКИЕ НАУКИ
## PEDAGOGICAL SCIENCES

49 Олимпия таълими дастурларининг мазмуни
Мамажонов Д.А, Тураев В.Б ..... 282
50 On the questions of improving the professional skills of the teacher
Rakhmatova O ..... 290
51 Formation of professional competence of biology students in english classroom
Yuldasheva M .B ..... 294
52 Илғор хорижий давлатлар олий таълим муассасаларида корпоратив бошқарувнинг ташкилий-педагогик хусусиятлари
Абдурасулов А А ..... 298
53 Бўлажак муҳандисларнинг илмий-тадқиқот компетентлигини шакллантириш жараёнини моделлаштириш
Ахмедов А Б ..... 303
54 Ал Хоразмийнинг меросни тақсимлаш ҳақидаги қарашлари ва унинг c++builder алгоритмик тилидаги дастури
Арипов М.М.,Орипова У..... 308
55 Мактабгача таълим ташкилоти тарбиячиларининг касбий маҳоратини ошириш йўллари
Бердалиева Г А ..... 315
56 Ажиниёз шоир ижодида фалсафа ва дунёқараш
Таспанова Ж.К ..... 320
57 Некоторые аспекты в подготовке детей дошкольного возраста к программированию
Икромова М.Н. ..... 326
58 Бўлажак дастурчиларни касбий фаолиятга тайёрлашда дастурий воситалар имкониятларидан фойдаланиш методикаси
Тўраев М .Ф ..... 332
59 Maple tizimi yordamida tekislikda vektorlarni qo'shishning animatsiya usulidan foydalanib talabalarning matematik kompetentligini rivojlantirish orqali o'qitishning sifat va samaradorligini oshirish
Mirzakarimov E. M, Fayzullayev J. I ..... 337
60 Ўзбекистон-япония таълим тизими ривожланиш истиқболлари
Хошимов Ф.Ф. Эгамбердиева Р. Файзуллаева М.Ф. ..... 343