

Webwork – to add or change a figure in a problem (same start as edit old problem)

Go to the Hmwk sets editor page

MAIN MENU

- Courses
- Homework Sets
- User Settings
- Grades
- Instructor Tools
  - Classlist Editor
  - Hmwk Sets Editor**
  - Library Browser
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  - Course Configuration
  - Help
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## Hmwk Sets Editor

Please select action to be performed.

Show/Hide Site Description

Select an action to perform:

Filter Sort Edit Publish Import Export Score Create Delete

Show which sets?:

Match on what? (separate multiple IDs with commas):

Take Action!

Showing 46 out of 46 sets.

Set List							
<input type="checkbox"/>	Edit Set Data	Edit Problems	Edit Assigned Users	Visible	Open Date	Close Date	Answer Date
<input type="checkbox"/>	Chapter 3	3	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 4	10	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 5	8	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 6	8	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 7	1	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm

Click on the number in the Edit problems column for the problem set you want

<input type="checkbox"/>	ECE514 HW 01 gen fall2020	10	1/44	No	08/12/2020 at 09:00am	08/18/2020 at 11:59pm	08/20/2020 at 01:00am
<input type="checkbox"/>	ece514 hw01 fall2020	10	41/44	Yes	08/12/2020 at 09:00am	08/25/2020 at 11:59pm	08/25/2020 at 11:59pm
<input type="checkbox"/>	ece514 hw02 fall2020	10	41/44	Yes	08/18/2020 at 11:30am	08/25/2020 at 11:59pm	08/26/2020 at 11:59pm
<input type="checkbox"/>	MAAtutorial fall2020	16	41/44	Yes	08/10/2020 at 06:00am	08/31/2020 at 06:00am	01/01/2021 at 01:42pm
<input type="checkbox"/>	Orientation fall2020	15	41/44	Yes	08/10/2020 at 07:55am	08/31/2020 at 07:55am	01/01/2021 at 01:42pm
<input type="checkbox"/>	ece514 hw03 fall2020	9	44/44	Yes	08/20/2020 at 03:30pm	09/03/2020 at 11:59pm	09/04/2020 at 11:59pm
<input type="checkbox"/>	ece514 hw04 fall2020	7	44/44	Yes	08/31/2020 at 08:30am	09/15/2020 at 11:59pm	09/16/2020 at 10:59pm
<input type="checkbox"/>	ece514 hw05 fall2020	6	44/44	Yes	09/04/2020 at 11:14am	09/22/2020 at 11:57pm	09/23/2020 at 11:59pm
<input type="checkbox"/>	Webwork practice 1	5	1/44	No	11/15/2021 at 09:07am	11/22/2021 at 09:07am	11/22/2021 at 09:07am
<input type="checkbox"/>	Probability problems	25	1/44	No	07/06/2024 at 09:39pm	07/13/2024 at 09:39pm	07/13/2024 at 09:39pm
<input type="checkbox"/>	joel test	38	1/44	No	04/02/2022 at 11:22am	12/31/2025 at 11:22am	12/31/2025 at 11:22am
<input type="checkbox"/>	Probability 514	0	1/44	No	04/22/2026 at 09:39pm	04/29/2026 at 09:39pm	05/01/2026 at 09:39pm

Please select action to be performed.

This brings up the Set Detail page for the problem set of interest

- Courses
- Homework Sets
  - ece514\_hw05\_fall2020
- User Settings
- Grades
- Instructor Tools
  - Classlist Editor
  - Hint & Sub Editor
  - ece514\_hw05\_fall2020**
  - Library Browser
  - Statistics
    - ece514\_hw05\_fall2020
  - Student Progress
    - ece514\_hw05\_fall2020
  - Scoring Tools
  - Email
  - File Manager
  - Course Configuration
  - Help
- Report bugs

## Set Detail 2 for set ece514\_hw05\_fall2020

This set ece514\_hw05\_fall2020 is assigned to all students. [Edit individual versions of set ece514\\_hw05\\_fall2020.](#)

Any changes made below will be reflected in the set for ALL students.

[Save Changes](#) [Reset Form](#)

General Information	
Opens	09/04/2020 at 11:14am
Closes	09/22/2020 at 11:57pm
Answers Available	09/23/2020 at 11:59pm
Visible to Students	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hide Hints from Students	No <input type="checkbox"/> Yes <input checked="" type="checkbox"/>
Assignment type	homework

### Set Description

Headers	Data
Set Header	defaultHeader
	Use Default Header File
Hardcopy Header	defaultHeader
	Use Default Header File

### Problems

[Renumber Problems](#) [Render All](#) [Hide All](#) [Display Mode: images](#)

1		Weight	14	Source File	local/ECE514/Papoulis_4ed_Chapter_5/Papoulis_4ec
<input type="checkbox"/>	Delete it?	Max attempts	7		
<input type="checkbox"/>	Mark Correct?				

I usually click the “render all” button so I can see all the problems, but if you know which problem you want to edit and don’t need a reminder of what it looks like, you can click on the edit button (pencil) and go directly to the editor. The next screenshot shows the rendered page.

webwork / ece\_514\_001\_fall\_2020 / ece514\_hw05\_fall2020 / 2

## ece514 hw05 fall2020: Problem 2

[Previous Problem](#) [Problem List](#) [Next Problem](#) This set is visible to students.

(30 points) local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6.6.1.pg  
 $x$  and  $y$  are independent and identically distributed (i.i.d) random variables with common p.d.f  $f_x(x) = e^{-x}U(x)$  and  $f_y(y) = e^{-y}U(y)$ . Find the p.d.f of the random variable  $z$ , if:

- $z = x + y$ ,  $f_z(z) =$   U(z) help (numbers)
- $z = x - y$ ,  $f_z(z) =$   for  $-\infty \leq z \leq \infty$  help (numbers)
- $z = \frac{x}{y}$ ,  $f_z(z) =$   U(z) help (numbers)
- $z = \min(x, y)$ ,  $f_z(z) =$   U(z) help (numbers)
- $z = \max(x, y)$ ,  $f_z(z) =$   U(z) help (numbers)
- $z = \frac{\min(x,y)}{\max(x,y)}$ ,  $f_z(z) =$   for   $\leq z \leq$   help (numbers)

[Solution:](#)

**Note:** You can earn partial credit on this problem.

[Get a new version of this problem](#)

Edit3

Show:  Correct Answers

[Preview My Answers](#) [Check Answers](#)

You have attempted this problem 0 times.  
This homework set is closed.

[Show Past Answers](#)

[Email WeBWork TA](#)

This set is visible to students.

In this case, we want to insert a figure in the solution to better show the limits of integration. To show the solution, click on the *Solution:* link at the end of the problem statement. Now we have

(30 points) local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg

$x$  and  $y$  are independent and identically distributed (i.i.d) random variables with common p.d.f  $f_x(x) = e^{-x}U(x)$  and  $f_y(y) = e^{-y}U(y)$ . Find the p.d.f of the random variable  $z$ , if:

a)  $z = x + y$ ,  $f_z(z) =$   U(z) help (numbers)

b)  $z = x - y$ ,  $f_z(z) =$   for  $-\infty \leq z \leq \infty$  help (numbers)

c)  $z = \frac{x}{y}$ ,  $f_z(z) =$   U(z) help (numbers)

d)  $z = \min(x, y)$ ,  $f_z(z) =$   U(z) help (numbers)

e)  $z = \max(x, y)$ ,  $f_z(z) =$   U(z) help (numbers)

f)  $z = \frac{\min(x,y)}{\max(x,y)}$ ,  $f_z(z) =$   for   $\leq z \leq$   help (numbers)

**Solution:**

( Instructor solution preview: show the student solution after due date. )

**SOLUTION**


a) Define  $Z = X + Y$

First, we observe that since  $X$  and  $Y$  are both non-negative,  $Z$  should be non-negative. Second, we can express the CDF of  $Z$  as

$$F_Z(z) = P(X + Y \leq z) = P(Y \leq -X + z).$$

This corresponds to the region below the line  $y = -x + z$ , which has slope -1 and y-intercept  $z$ . We are interested in where this region intersects with the region where the joint PDF of  $X$  and  $Y$  is nonzero. This joint PDF is nonzero only in the first quadrant of the  $x/y$  plane. For  $z < 0$ , the intersection of these two regions is zero, so  $F_Z(z) = 0, z < 0$ .

For  $z > 0$  the intersection is a closed region (triangle) whose boundaries are the  $x$ -axis from 0 to  $z$ , the  $y$ -axis from 0 to  $z$ , and the line segment defined by  $y = -x + z, x \in [0, 1]$ .

Put figure here 

We can integrate over this region by summing small horizontal regions, such as  $x$  from 0 to  $z - y$  and  $y$  from 0 to  $(dy)$ . This gives

$$\begin{aligned} F_Z(z) &= \int_{y=0}^z \int_{x=0}^{z-y} e^{-x} e^{-y} dx dy = \int_{y=0}^z (-e^{-x}|_0^{z-y}) e^{-y} dy \\ &= \int_{y=0}^z (1 - e^{-(z-y)}) e^{-y} dy = \int_{y=0}^z (e^{-y} - e^{-z}) dy \\ &= e^{-y}|_0^z - e^{-z}y|_0^z = 1 - e^{-z} - ze^{-z}. \end{aligned}$$

Taking the derivative,  $f_Z(z) = e^{-z} - ((1)e^{-z} + z(-e^{-z})) = ze^{-z}$ .

Overall,  $f_Z(z) = ze^{-z}U(z)$ .

CHECK: We know the pdf of the sum of two independent random variables is the convolution of the pdfs of the random variables:

$$f_z(z) = \int_{-\infty}^{\infty} f_x(z-y)f_y(y)dy = \int_{-\infty}^{\infty} e^{-(z-y)}U(z-y)e^{-y}U(y)dy$$

We want to insert a figure in the place indicated on the solution. Let us assume we have the figure created. **Always use a \*.png format.** The figure has the file name

ece514\_hw05\_prob2a\_fig.png

We need to **put it into the folder that contains the problem** and edit the problem to insert the command to display the image. Let's edit the problem first.

Click on the edit icon for the problem. This gives

## Problem 2

Editing set ece514\_hw05\_fall2020/problem 2 in file '[TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg'

Problem Techniques

Math Objects

POD

PGLab

PGML

Author Info

Report Bugs in this Problem

```
1 ## DESCRIPTION
2 # Problem for 'NCSU ECE514 Krim'.
3 # WeBWorK problem written by H. J. Trussell, <hjt@ncsu.edu>
4 # ENDDescription
5 ## DBsubject(Electrical Engineering)
6 ## DBchapter(CHAPTER 6)
7 ## DBsection(NA)
8 ## Institution(North Carolina State University)
9 ## Autho(H. J. Trussell)
10 ## TitleText1('Probability, Random Variables and Stochastic Processes')
11 ## AuthorText1('Athanasios Papoulis', 'S. Unnikrishna Pillai')
12 ## EditionText1('4')
13 ## Problem1('6.1')
14 ## Keywords('function of random variable')
15 ## Resources()
16
17 DOCUMENT();
18
19 loadMacros("PG.pl",
20           "PGbasicmacros.pl",
```

View

Update

NewVersion

Append

Save to [TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg and View

Open in new window

Take Action!

Note the file name of the problem shows at the top right. This gives the path of the folder for the problem: *TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/*


We will use this when we upload the figure to Webwork.

Now, scroll down to the solution block and edit the point to insert the display command for the image macro.

## Problem 2

Editing set ece514\_hw05\_fall2020/problem 2 in file '[TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg'

Problem Techniques Math Objects POD PGLab PGML Author Info Report Bugs in this Problem

```
81 $PAR
82 $BBOLD SOLUTION $EBOLD
83 $PAR
84 a) Define  $( Z = X + Y )$  $BR
85 First, we observe that since  $(X)$  and  $(Y)$  are both non-negative,  $(Z)$ 
should be non-negative. Second, we can express the CDF of  $(Z)$  as $BR
86 $SPACE $SPACE $SPACE $SPACE  $( F_Z(z) = P(X+Y \leq z) = P(Y \leq -X + z)$ 
 $)$ . $BR
87 This corresponds to the region below the line  $( y = -x + z )$ , which has
slope -1 and y-intercept  $(z)$ . We are interested in where this region
intersects with the region where the joint PDF of  $(X)$  and  $(Y)$  is
nonzero. This joint PDF is nonzero only in the first quadrant of the x/y
plane. For  $( z < 0 )$ , the intersection of these two regions is zero, so  $($ 
 $F_Z(z) = 0, z < 0 )$ .
88 $PAR
89 For  $( z > 0 )$  the intersection is a closed region (triangle) whose
boundaries are the x-axis from 0 to  $(z)$ , the y-axis from 0 to  $(z)$ , and
the line segment defined by  $( y = -x + z, x \in [0,1] )$ .
90 $PAR
91 Put figure here 
```

View Update NewVersion Append

Save to [TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg and View

The image macro is called by

```
\{ image( " ece514_hw05_prob2a_fig.png" , width=>300, height=>300, ) \}
```

[Problem Techniques](#)
[Math Objects](#)
[POD](#)
[PGLab](#)
[PGML](#)
[Author Info](#)
[Report Bugs in this Problem](#)

```

88 $PAR
89 For  $(z > 0)$  the intersection is a closed region (triangle) whose
    boundaries are the x-axis from 0 to  $(z)$ , the y-axis from 0 to  $(z)$ , and
    the line segment defined by  $(y = -x + z, x \in [0,1])$ .
90 $PAR
91  $\{ image( "ece514_hw05_prob2a_fig.png" , width=>300, height=>300, ) \}$ 
92 $PAR
93 We can integrate over this region by summing small horizontal regions, such
    as  $(x)$  from 0 to  $(z-y)$  and  $(y)$  from 0 to  $(dy)$ . This gives $BR
94  $\{ \begin{aligned}$ 
95      $F_Z(z) &= \int_{y=0}^z \int_{x=0}^{z-y} e^{-x} e^{-y} dx dy$ 
96      $= \int_{y=0}^z \left( -e^{-x} \Big|_0^{z-y} \right) e^{-y} dy$ 
97      $= \int_{y=0}^z \left( 1 - e^{-(z-y)} \right) e^{-y} dy$ 
98      $= \int_{y=0}^z \left( e^{-y} - e^{-z} \right) dy$ 
99      $= e^{-y} \Big|_0^z - e^{-z} y \Big|_0^z = 1 - e^{-z} - ze^{-z}.$ 
100  $\end{aligned}$ 
101  $\}$ 
102 $PAR
103 Taking the derivative,
104  $(f_Z(z) = e^{-z} - \left( (1)e^{-z} + z(-e^{-z}) \right) = ze^{-z})$ .
    
```

[View](#)
[Update](#)
[NewVersion](#)
[Append](#)

Save to [TMPL]/local/ECE514/Papoulis\_4ed\_Chapter\_6/Papoulis\_4ed\_Chapter\_6\_6.1.pg and View

Open in new window

Take Action!

Click “Update”

Click “Take Action”

At this point, The problem will render but without a figure. You’ll get an error since the figure file is not in the folder with the problem. You’ll see something like

auxiliary file ece514\_hw05\_prob2a.png missing resource path

Now, we’ll use the **File Manager** to upload the file. Click on File manager in the left hand menu. This show the files in the highest folder, the templates folder [TMPL] in the Webwork path. We need to go to *local/ECE514/Papoulis\_4ed\_Chapter\_6*

**Double Click** on local/ in the file/folder list

# File Manager

^ templates ^  Show Date & Size

- ECE220\_master.tgz
- LCR/
- Library@
- achievements/
- chapter2.tgz.7z
- course\_info.txt
- email/
- local/ ←
- local.tgz
- localECE220/
- local\_1.tgz
- local\_2.tgz
- local\_3-24-14.tgz
- macros/
- setChapter\_2.def
- setChapter\_2.def.bak
- setChapter\_3.def

Upload Browse... No file selected.

Format:  Text  Binary  Automatic

Overwrite existing files silently

Unpack archives automatically  then delete them

View Edit Download Rename Copy Delete Make Archive New File New Folder Refresh

This brings up the \local folder list. **Double Click** on ECE514/, then **double click** on Papoulis\_4ed\_Chapter\_6/. This takes you to the folder in which to upload the figure file.

Click the browse button and locate and select the file ece514\_hw05\_prob2a\_fig.png

Click Upload

The list will show the new file in the folder



## File Manager

^ Papoulis\_4ed\_Chapter\_6

- Papoulis\_4ed\_Chapter\_6\_6.1.pg
- Papoulis\_4ed\_Chapter\_6\_6.1\_debug.pg
- Papoulis\_4ed\_Chapter\_6\_6.3.pg
- Papoulis\_4ed\_Chapter\_6\_6.5.pg
- Papoulis\_4ed\_Chapter\_6\_6.17.pg
- Papoulis\_4ed\_Chapter\_6\_6.20.pg
- Papoulis\_4ed\_Chapter\_6\_6.56.pg
- Papoulis\_4ed\_Chapter\_6\_6.65.pg
- Papoulis\_4ed\_Chapter\_6\_6.65\_proof.pg
- Papoulis\_4ed\_Chapter\_6\_6\_3.png
- Papoulis\_6\_6-1\_fig.png
- ece514\_hw05\_prob2a\_fig.png
- ece514\_hw05\_prob2b\_fig1.png
- ece514\_hw05\_prob2b\_fig2.png

Show Date & Size

View  
Edit  
Download  
Rename  
Copy  
Delete  
Make Archive  
New File  
New Folder  
Refresh

No file selected.

Format:  Text  Binary  Automatic

Overwrite existing files silently

Unpack archives automatically  then delete them

Return to the problem editor and click Update and Take Action. Now the problem will render without error.

You'll need to click the Solution: link to view the figure.

Repeat of saving problem for Export is the same as discussed in that instruction file:

Instructions\_editing\_problem\_in\_old\_sets



The problem is now ready for the students. However, there is one more step that needs to be done to save to the new file to Webwork archives. Go back to the Webwork Hmwk Sets Editor page and click the “Export” tab.

## Hmwk Sets Editor

Please select action to be performed.

Show/Hide Site Description

Select an action to perform:

Filter Sort Edit Publish Import **Export** Score Create Delete

Show which sets?: enter matching set IDs below

Match on what? (separate multiple IDs with commas):

Take Action!

Showing 46 out of 46 sets.

Set List							
<input type="checkbox"/>	Edit Set Data	Edit Problems	Edit Assigned Users	Visible	Open Date	Close Date	Answer Date
<input type="checkbox"/>	Chapter 3	3	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 4	10	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 5	8	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 6	8	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm
<input type="checkbox"/>	Chapter 7	1	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm

Verify that Export which sets? Is set to visible sets. Then click “take action.” This will show that Webwork is setting to export visible sets – note the green line

## Hmwk Sets Editor

Results of last action performed:  
exporting visible sets

Show/Hide Site Description

Select an action to perform:

Save Export

Cancel Export

Export selected sets

Take Action!

Showing 46 out of 46 sets.

### Set List

	Edit Set Data	Edit Problems	Edit Assigned Users
<input checked="" type="checkbox"/>	Chapter 3	3	1/44
<input checked="" type="checkbox"/>	Chapter 4	10	1/44
<input checked="" type="checkbox"/>	Chapter 5	8	1/44
<input checked="" type="checkbox"/>	Chapter 6	8	1/44

**You need to click “Take Action” one more time to complete the export operation! This updates the \*.def files in the Webwork archive. Do not omit this action! You may lose your edits, not for this semester but for the next semester, if you create a new archive without completing the export. This gives**

# Hmwk Sets Editor

Results of last action performed:  
46 sets exported, 0 sets skipped. Skipped sets:  
( )

Show/Hide Site Description

Select an action to perform:

- Filter
- Sort
- Edit
- Publish
- Import
- Export
- Score
- Create
- Delete

Show which sets?:

Match on what? (separate multiple IDs with commas)\*:

Take Action!

Showing 46 out of 46 sets.

Set List							
<input type="checkbox"/>	Edit Set Data	Edit Problems	Edit Assigned Users	Visible	Open Date	Close Date	Answer Date
<input checked="" type="checkbox"/>	Chapter 3	3	1/44	No	06/02/2014 at 01:42pm	03/02/2018 at 01:42pm	01/01/2021 at 01:42pm