CASELLA AND BERGER NOTES AND EXERCISES - CHAPTER 2

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Chapter 2 Exercises

Using this problem set: http://www.stat.ufl.edu/ jhobert/sta6326

Chapter 2: 1, 2, 3, 4, 9, 11, 12, 13, 14, 16, 17

Chapter 2: 22, 23, 25, 26, 27, 30, 31, 33, 36, 38

(2.1)

Apply change of variables for each.

Check that the given PDF's are PDF's and then the result follows.

(2.2)

Apply change of variables again. Straight forward.

(2.3)

This one tripped me up for some reason. Let B be a measurable set in the image of Y. Since X is discrete $B = \{b\}$. Then $P(Y \in B) \iff P(Y = b) \iff P(X = b/(1-b)) = f_X(b/(1-b))$

It is much straight forward to just change the variables this way in my opinion instead of using distribution functions or something.

(2.4)

This is clear by the definition and additivity of the integral.

(2.9)

The distribution function.

(2.11)

TODO COME BACK TO THIS

(2.12)

(2.14)

Very nice application of Fubini's Theorem.

(2.16)

TODO

(2.17)

Straight forward.

(2.22)

REDO Tricky. Better to transform into the Gamma function.

(2.23)

Kind of a change of variables in integration problem.

(2.25)

For some reason I got messed up on this change of variables.

(2.26)

REDO first parts are tricky.

(2.27)

TODO

(3.30, 3.31, 3.33, 3.36, 3.38)

These are all pretty straight forward power series transformation stuff.

Notes

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Changing the variables in measures should really go like this:

For any measurable set B, $P(Y \in B) \iff \cdots$ And use change of variables.

Example: $P(-t \leq Y \leq t)$ for continous or $P(X = t)$ for discrete since these are the measurable sets.

USE THIS FORMULA WHEN CHANGING VARIABLES $P(X \in B) \iff P(b_1 \leq X \leq b_2)$ or $P(X \in B) \iff P(X = t)$

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I really forgot how to use by parts. It really follows from FTC2 (See Munkres).