

## Analysis Qualifying Exam Solutions

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### Analysis Qualifying Exam Solutions

UCLA Analysis Qualifying Exam Solutions Last updated: July 27, 2020 List of people that have contributed solutions: Adam Lott William Swartworth Matthew Stone Ryan Wallace Bjoern Bringmann Aaron George James Leng Compiled and maintained by Adam Lott Contents 1 Spring 2009 3 2 Fall 2009 8 3 Spring 2010 13 4 Fall 2010 17 5 Spring 2011 23 6 Fall ...

### UCLA Analysis Qualifying Exam Solutions

Chapter 1 Spring 2011 1.1 Real Analysis A1. (a)  $l_1(Z)$  is separable. A countable set whose finite linear combinations are dense in  $l_1(Z)$ , where  $e_n$  has a 1 in the  $n$ th position and is 0 everywhere else. If  $x \in l_1(Z)$ , then the sums  $\sum_{k=1}^N x_k e_k$  approximate  $x$  arbitrarily well in the norm as  $N \rightarrow \infty$  since

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REAL ANALYSIS QUALIFYING EXAM SOLUTIONS REAL ANALYSIS PH.D. QUALIFYING EXAM SOLUTION SET January 31, 2009 A passing paper consists of 7 problems solved completely, or 6 solved completely with substantial progress on 2 others. 1. Let  $(X; d)$  be a metric space. A set  $E \subset X$  is called discrete if there is  $\delta > 0$  such that, for all  $x$  and  $y$  in

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### Analysis Qualifying Exams Solutions

Complex Analysis Qualifying Exam Solutions May 21, 2014 Part 1. 1. Let  $\log z$  be the principal branch of the logarithm defined on  $G = \{z \in \mathbb{C} : \operatorname{Im} z \in (-\pi, \pi)\}$ . Show that if  $t > 0$ , then the equation  $\log z = t z$  has exactly one root in  $G$ . Solution. Let  $z = re^{i\theta}$  where  $r > 0$  and  $-\pi < \theta < \pi$ . Then  $\log z = t z$  becomes  $\log r + i\theta = t r \cos \theta + i t r \sin \theta$ . Since  $\theta = t r \sin \theta$

### Complex Analysis Qualifying Exam Solutions

Qualifying Examination in Analysis January, 2012 • If you have any difficulty with the wording of the following problems please contact the supervisor immediately. All persons responsible for these problems, in principle, will be accessible during the entire duration of the exam. • You are allowed to rely on a previous part of a multi-part ...

### Qualifying Examination in Analysis

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4 ANALYSIS QUALIFYING EXAM FALL 2016: SOLUTIONS Problem 5. The space  $l_2$  is defined by  $\sum_{n=1}^{\infty} |x_n|^2 < \infty$ :  $x = (x_n)_{n \in \mathbb{N}} \in l_2$  if  $\sum_{n=1}^{\infty} |x_n|^2 < \infty$  and  $\|x\|_2 = \left(\sum_{n=1}^{\infty} |x_n|^2\right)^{1/2}$ . This space is a complex normed vector space with the norm  $\|x\|_2 = \left(\sum_{n=1}^{\infty} |x_n|^2\right)^{1/2}$ . (You may use this fact without proof.) Prove that the closed unit ball of  $l_2$  is not compact. Solution ...

### Solution. - University of Oregon

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Ph.D. QUALIFYING EXAM IN REAL ANALYSIS January 10, 2008 Three hours There are 11 questions. A passing paper consists of 6 questions done completely correctly, or 5 questions done correctly with substantial progress on 2 others. 1. Let  $\{x_n\}_{n=1}^{\infty}$  be a bounded sequence in  $\mathbb{R}$ . Assume that every convergent subsequence converges to the same real number.

### Ph.D. QUALIFYING EXAM IN REAL ANALYSIS

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### Analysis Qualifying Exam Solutions - atleticarechi.it

They are solutions that I wrote up: some helped by fellow graduate students, some helped by faculty, and some done by myself. They are not guaranteed to be correct, although I believe them to be. Qualifying Exam Solutions. Algebra Qualifying Exam Solutions Analysis Qualifying Exam Solutions

### Qualifying Exam Solutions

The qualifying exams in Algebra and in Analysis are offered on different days, the same week. On the day of each exam, Part A is given in the morning, while parts B and C are given in the afternoon. It is possible for a student to pass Part A in one attempt, and Part B or C at a different date.

### Old Qualifying Exams | Department of Mathematics

Qualifying Exam Problems: Analysis (Jan 10, 2015) 1. (10 points) For each value of the real constant  $a > 0$ , discuss the convergence of the series  $\sum_{n=1}^{\infty} \frac{a^n}{(n!)^n}$ . Solution: By using the obvious inequality  $n! \leq n^n$ , we get  $\frac{a^n}{(n!)^n} \geq \frac{a^n}{n^{n^2}}$ . Thus if  $a \geq 1$ , then the series diverges. On the other hand, if  $0 < a < 1$ , then  $\frac{a^n}{(n!)^n} \leq \frac{a^n}{n^n}$ .

### Qualifying Exam Problems: Analysis

Analysis Qualifying Exam Solutions - atcloud.com Return to Qual Page Analysis Qualifying Exams Solutions 4 ANALYSIS QUALIFYING EXAM FALL 2016: SOLUTIONS Problem 5. The space  $l_2$  is defined by  $\sum_{n \in \mathbb{Z}^+} |x_n|^2 < \infty$ :  $x \in l_2$  for all  $n \in \mathbb{Z}^+$  and  $\sum_{n=1}^{\infty} |x_n|^2 < \infty$ : This space is a complex normed vector

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REAL ANALYSIS PH.D. QUALIFYING EXAM SOLUTION SET January 31, 2009 A passing paper consists of 7 problems solved completely, or 6 solved completely with substantial progress on 2 others. 1. Let  $(X; d)$  be a metric space. A set  $E \subseteq X$  is called discrete if there is  $\epsilon > 0$  such that, for all  $x$  and  $y$  in  $E$  with  $x \neq y$  we have  $d(x; y) > \epsilon$ .

### REAL ANALYSIS PH.D. QUALIFYING EXAM SOLUTION SET 1. $\mu \in \mathbb{R}$

Qualifying Exam Archives. Algebra Analysis Differential Geometry Probability Topology. ... Winter 2019 - Algebra • Winter 2019 - Algebra Solutions Please note that the Algebra exams for winter 2019 say 2018 on them. They are the exams that were administered December 2018. Fall 2018 - Algebra • Fall 2018 ... Analysis Solutions ...

### Qualifying Exam Archives | Department of Mathematics

Qualifying Examination in Analysis August 2015 If you have any difficulty with the wording of the following problems, please contact the supervisor immediately. You are allowed to rely on a previous part of a multi-part problem even if you do not work out the previous part. Notation:  $\mathbb{R}$  denotes the real numbers,  $\mathbb{N}$  the positive integers, and  $\mathbb{C}$  the

### Qualifying Examination in Analysis

Qualifying exams are four hour written exams, and are given twice a year, ... There are Area exams in Algebra, Analysis, Applied Differential Equations, Numerical Analysis, Geometry /Topology, and Logic. Students may attempt any number of examinations in each examination period.

### Qualifying Exams | UCLA Department of Mathematics

Complex Analysis. Github Repo with Progress and Syllabus. UGA Qual Questions and Solutions (PDF)

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(Markdown/Tex Source) UGA's Collection of Past Exams; Review Notes: A collection of extra questions, courtesy of Jingzhi Tie (Markdown/Tex Source) Solutions: Solutions to Jingzhi's Problems: (PDF, Todo) Solutions to Quals by Year: ? - ? (PDF ...

### Qualifying Exam Resources - D. Zack Garza

Complex Analysis Qualifying Exam August 10, 2018 1. [25 points] True or false (Justification is needed): a) If a power series  $\sum_{n=0}^{\infty} a_n z^n$  has a finite non-zero radius of convergence, say  $r$ , then for every  $w \in \mathbb{C}$  with  $|w| < r$ , the series  $\sum_{n=0}^{\infty} a_n w^n$  is convergent. b) The function  $p(z) = 5z^3 + 4z^{11} + 3z^4$  has 5 roots inside the unit disk  $|z| < 1$ . c) If  $f(z)$  is nonconstant and entire then  $\max_{|z|=1} |f(z)| > \max_{|z|=1} |f'(z)|$ .

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