Math 185 LEC3: Introduction to Complex Analysis

UC Berkeley, Fall 2020

- Instructor: Peng Zhou
- Email: pzhou.math@berkeley.edu
- Zoom Personal Meeting ID: 881-910-2324
- Lecture: TuTh 9:30-11:00, online at online lecture room [https://berkeley.zoom.us/j/97213430388?pwd=dHJCRG5mNnhsb2tzQTBQd1A4b09LZz09], see details here
- Office Hour: by appointment. Usually free right after class.
- GSI (for office hours), see here [https://math.berkeley.edu/~tdz/185/]

Syllabus

- I will loosely follow Stein-Shakarchi's first 3 chapters, then add additional topics for the remaining time.
- Grading Policy: 50% homework, two midterms each 10%, take home final 30%.

References

- Stein-Shakarchi, *Complex Analayis*
- Ahlfors: *Complex analysis. An introduction to the theory of analytic functions of one complex variable*
- Gamelin: *Complex Analysis (Undergraduate Text in Math)*
- Schaum's outlines: complex variables. *This is a practical book, with lots of examples of easy to intermediate levels. The PDF is available at Berkeley library.*

Links

- Zoom chat channel: we also have a zoom chat channel, search for “Math 185-3: complex analysis” and join. You can contact me there.
- Online discussion Piazza [https://piazza.com/berkeley/fall2020/math185lecture3]. Sign up with access code “riemann”.
- Online homework / exam submission: Gradescope [https://www.gradescope.com/]. entry code 982WDY
- Latex Online: https://overleaf.com [https://overleaf.com]. Here is a sample template file to get you started. video tutorial [https://berkeley.zoom.us/rec/share/_6tSco_Fa7O-O2GNjD4XtxGW3BrRieJGcm1HbpVkAy-82fayfhyGZkcMu5OStCe3._g_9jpSQLA2nyitQ] Passcode: c+D+B?9M

Lectures

Date	Reading	Content	notes	video and passcode
Aug 27 Thu	[S] 1.1.1 [A] 1.2	Overview of the course. Complex Numbers.	note	
Sep 1 Tue	[S] 1.1.3, 1.2.2	Review of topology and Holomorphic Functions.	note	video [https://berkeley.zoom.us/rec/share/3pxTM5fq23JOQ6fXtUycZrM9HqP7aaa8hCUc_KZfz0soYL_uKpVZaf2Giv8TDMNA] Y^?bY700
Sep 3 Thu	[S] 1.2.3	Power Series	note	video [https://berkeley.zoom.us/rec/share/V9rbbp32itBsIcEndonDqIwifkK-ocIgdwUWS5nc4HEeJH_fjboh2YpMxG3VMgp8.KtWrQMDd10vcNSze] ##cDRb5e
Sep 8 Tue	[S] 1.3	Integration Along Curve	note	video [https://berkeley.zoom.us/rec/share/0jJejWRAV7l3PN7VLI2uDIbs6poX87VJcjhXFzbCxkP8qhLNNbYggeElEwwn-E1Z.sgaof7uAuEZ-XRTE?startTime=1599583308000] vT+=b2Xi
Sep 10 Thu	[S] 1.3, 2.1	Finish Ch 1. Begin Goursat's Thm	note	video [https://berkeley.zoom.us/rec/share/Yf5pD1neRQ04RlN6AbouWBjBZFrbrgxLE_fBh3F4lINjEsYOyxa8vSfduDtRIe3k.G3a8H30ObocYr6Vr] ^=AhAr58
Sep 15 Tue	[S] 2.1, 2.2	Goursat, Cauchy theorem on disk	note	video [https://berkeley.zoom.us/rec/share/nTANA5xvshdfbqCeU03NcMQKHO9ZdBNC27vTwpTFqEIvPjgxG1VYb3WLKEB8Lnid.LOg5grsj5E3sb2] $Cd@kAe0
Sep 17, Tue	[S] 2.4(a), 2.3	Cauchy Integral Formula, and Sample Calculations	note	video [https://berkeley.zoom.us/rec/share/eUT_yR2PE0iBUG9YluvJFibr5Lgs-bR9J1qQ9moJUOCST-0itsEQ1I3TM20JlHFh.czwooKblQQdwLpoa] eA2!V7oR
Sep 22	[S]2.3, 2.4	More on contour	note	video [https://berkeley.zoom.us/rec/share/ogj5skICg6A_i0aPRCuDPlH1UkvA4VN3XAluvt8PjlQ_1e86zq6j13Elfy02HwKJ.Kmwb9HyPDNxp8fYJ]

		integral examples. Cauchy estimate		+6%m*Hsp
Sep 24	[S] 2.4, 2.5.1	Corollary to Cauchy integral Formula	note	video [https://berkeley.zoom.us/rec/share/M50r2oJaW4C_huJQYP3gs0ubuBQQ8t7D929N32s0NbyXFit7EXW-fP5et0WaQHD9.XYGTqyW0EDaacL5-] ZQF.q$0&
Sep 29	[S] 2.5	Schwarz Reflection Principle,	note	video [https://berkeley.zoom.us/rec/share/AOjA7c8IejYnCVNjMvZJKdcO4jIM5lvVyt3FM5hYE5id5b7iFT6mq6_bCxAZktbY.W_4xMB2rhWUazt2x] h3=KBA21
Oct 1		Runge Approximation Theorem	note	video [https://berkeley.zoom.us/rec/share/JKb3TVJZcS1Qhy9pZ6QbJhzUBHiBMg8lAPxV-sPcBBDkREx_v91lGdOIfgRX0XA.G0BlXguq0qRWMPv8] FWA46%k5
Oct 6		Midterm 1 (review notes)	sol'n	stat
Oct 13	[S] 3.1	zero, poles and residues	note	video [https://berkeley.zoom.us/rec/share/66bqr8-HhMo858KTwxR2ct1W0QDUMfP8vxYYSRgHfSXc2py2aqdOd9YEcAr3flTQ.0RG1F1N8q-O9ZLTJ] B?*MH1bG
Oct 15	[S] 3.2 [A] 4.2	residues theorem, winding number	note	video [https://berkeley.zoom.us/rec/share/tgyvpfynOu33LnKRYhSlfHwBRbfgDxmhUNMO_5URUrc52FZi9M6QKcpE2oprgg0o.-s_D5Ehj3M-_1O8h] @k!6@pNt
Oct 20	[S] 3.3	classification of singularities	note	video [https://berkeley.zoom.us/rec/share/S-ZsJoHevHKoVBN--lfv6vNQGkVbP0RIYpAHqpA202PoK6T_OzXKiD430kk_W89X.uhl_NXpBil6f6fXu] f+2&L#Po
Oct 22	[S] 3.3, 3.4	global meromorphic functions are rational, argument principle	note	video [https://berkeley.zoom.us/rec/share/pRcKjF7CqJI81_kIr297qW54Na2itGB46L0hstggxbQlUTgzvCUBHND9Yyt-r7vc.4Slmri6gFa2F79X] ih0XF3X#

Homework

HW 1	Due 09/10 11:59pm	2, 7, 16(a,c,e), 17, 22	in Ch 1.	solution tex
HW 2	Due 09/17 11:00pm	10, 11, 13, 18, 25	in Ch 1.	solution tex
HW 3	Due 09/25 10:00pm	1, 2, 4, 5, 6	Ch 2	solution
HW 4	Due 10/2 10:00pm	7,8,9,11,12	Ch 2	solution
HW 5	Due 10/23 10:00pm	1,2,3,7 and this	Ch 3	solution
HW 6	Due 10/30 10:00pm	HW 6: Meromorphic Functions		