

April 9, 2009

Complex Analysis

Lecturer: Professor Jean-Fu Kiang

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Textbook: D. G. Zill and M. R. Cullen, "Advanced Engineering Mathematics," 3rd ed., Pearson Education International, 2004.

Reference: A. D. Wunsch, "Complex Variables with Applications," 3rd ed., New York: Pearson Education, 2005.

- (1) Homework and quizzes: 20~30%
- (2) Midterm and final examinations: 70~80%
- (3) Reading assignments should be completed before the next lecture.
- (4) Hand in homework before the lecture on the due date.
- (5) Late homework is not accepted.

Lecture Topics	Lecture Date	Reading Assignments (Zill & Cullen)	Optional Reading (Wunsch)	Homework (Zill & Cullen)
Basic Operations Analytic Functions: Limit, Continuity, Derivative, Analyticity	2009/2/17	Sec.17.1-17.4	Ch.1 Sec.2.1-2.4	HW1 (190%): Ex.17.1 (31, 32, 34), Ex.17.2 (15, 21, 32, 34), Ex.17.3 (8, 12, 18, 23, 26), Ex.17.4 (8, 14, 22, 24, 32, 37, 39) Due <u>2009/2/24</u>
Cauchy-Riemann Equations: Harmonic Functions Elementary	2009/2/24	Sec.17.5-17.8	Sec.2.5, 2.6 Ch.3	HW2 (350%): Ex.17.5 (2, 5, 9, 12, 18, 20, 24, 26, 28, 31), Ex.17.6 (3, 6, 15, 16, 21, 24, 28, 31, 38, 39, 42,

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Functions: Exponential, Logarithmic, Trigonometric, Hyperbolic				47, 50), Ex.17.7 (3, 7, 9, 11, 15, 23, 27, 31), Ex.17.8 (1, 5, 9, 13) Due <u>2009/3/3</u>
Contour Integrals: ML Theorem, Green's Theorem	2009/3/3	Sec.18.1	Sec.4.1-4.3	<u>HW3 (90%)</u> Ex.18.1 (3, 9, 11, 21, 24, 25, 29, 31, 35) Due <u>2009/3/10</u>
Cauchy's Theorem: Contour Deformation, Antiderivative, Cauchy's Integral Formula, Liouville's Theorem	2009/3/10	Sec.18.2-18.4	Sec.4.4-4.6	<u>HW4 (170%)</u> Ex.18.2 (1, 5, 7, 11, 13, 22), Ex.18.3 (3, 5, 7, 17, 23), Ex.18.4 (3, 5, 11, 19, 21, 23) Due <u>2009/3/17</u>
Taylor Series: Complex Sequence, Complex Series, Geometric Series, Convergence Tests, Power Series, Taylor's Theorem	2009/3/17	Sec.19.1, 19.2	Sec.5.1-5.5	<u>HW5 (200%)</u> Ex.19.1 (3, 5, 9, 11, 13, 17, 19, 21, 23, 27), Ex.19.2 (1, 3, 7, 11, 13, 19, 21, 29, 33, 36) Due <u>2009/3/24</u>
Laurent Series: Laurent's Theorem, Zero, Residue Theorem	2009/3/24	Sec.19.3-19.5	Sec.5.6, 5.7, 6.1-6.3	<u>HW6 (200%)</u> Ex.19.3 (1, 5, 7, 15, 23, 27), Ex.19.4 (1, 3, 11, 13, 21, 23), Ex.19.5 (1, 3, 7, 11, 19, 23, 27, 29) Due <u>2009/3/31</u>
Review	2009/3/31			
Quiz 1 (Sec.17.1-Sec.19.2)	2009/4/7 明達館 205 教室			
Midterm Exam. (Sec.17.1-Sec.19.2)	2009/4/14 明達館 205 教室	Close Book		
Improper Integrals	2009/4/21	Sec.19.6 Supplemental	Sec.6.4-6.9	<u>HW7 (110%)</u> Ex.19.6 (1, 3, 7, 11, 15,

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		Examples		19, 23, 27, 31, 33, 35) Due <u>2009/4/28</u>
Kramer-Kronig Relation Landau Damping	2009/4/28			
Quiz 2 Supplemental Examples	2009/5/5 明達館 205 教室			
Inverse Laplace Transform: Computation Procedure, Residue Technique Waves in Polarized Medium	2009/5/12		Ch.7	<u>HW8 (120%) (Wunsch)</u> Ex.7.1 (1, 3, 5, 7, 9, 16, 17, 18, 19, 32, 33, 34) Due <u>2009/5/19</u>
Conformal Mapping	2009/5/19	Sec.20.1, 20.2	Sec.8.1-8.3	<u>HW9 (200%)</u> Ex.20.1 (1, 5, 7, 11, 13, 15, 19, 21, 25, 31), Ex.20.2 (1, 5, 7, 9, 11, 13, 17, 19, 21, 25) Due <u>2009/5/26</u>
Potential/Streamline Functions Bilinear Transformation Schwarz-Christoffel Transformation Poisson Integral Formulas	2009/5/26	Sec. 20.3-20.6	Sec. 8.4, 8.8	<u>HW10 (220%)</u> Ex.20.6 (1, 3, 7, 9, 11), Ex.20.3 (1, 3, 5, 9, 11, 15, 17, 21), Ex.20.4 (1, 3, 5, 9), Ex.20.5 (1, 3, 5, 7, 9) Due <u>2009/6/2</u>
Review	2009/6/2			
Quiz 3 (Sec.19.3-Sec.20.4)	2009/6/9 明達館 205 教室			
Final Exam. (Sec.19.3-Sec.20.4) Supplemental Examples	2009/6/16 明達館 205 教室	Close Book		