

The exam questions of «Theory of functions of complex variable»

1. The concept of complex numbers. The geometric interpretation.
2. Operations on complex numbers. The n-th root of complex number.
3. Extended complex plane, Riemann sphere. Stereographic Projection.
4. Sequences of complex numbers. Necessary and sufficient conditions for converging of Sequences of complex numbers,
5. Series of complex numbers Properties of convergent series.
6. Complex valued functions of real variable Domain and continues curves.
7. Open and closed Sets in complex plane. Function of complex variable it's continuity.
8. Differentiation of function of complex variable. Cauchy-Riemann conditions. The derivative of inverse function. Chain rule.
9. Analytical functions. Conformal mapping. Geometric mean of the derivative of complex variable function.
10. Linear function. Linear fractional function and it's properties.
11. Power function. It's properties. The multivalued function $\omega = \sqrt[n]{z}$ Exponential Function $w = \exp z$ and it's properties. The Logarithmic function $\omega = \operatorname{Ln} z$
12. Complex power function, Exponential function Trigonometric, hiperbolic functions, its'properties. Inverse trigonometric functions.
13. Piecewise smooth curves, on curve second type curvilinear integral in (x, y) plane. Determining the integral of function of complex variable. Properties of integral of complex variable function
14. Cauchy's theorem. Cauchy's theorem for more connected domains.
15. Primitive of function of complex variable. Newton-Leibniz formula. Cauchy integral. Cauchy 's integral formula.
16. The functional series: Convergence and uniformly convergence in the domain. Necessary and sufficient conditions of convergence and theorems. Power series. The converging disk, the converging radius.

17 .Decomposition to the power series as analytic function. The singularity points of analytic functions. Zeros of analytic function.

18. Laurent series. Converging ring. Isolated singularities of analytic function. Pole, simple pole, double pole.

LITERATURE

1.Theodore W.Gamelin. Complex Analysis. Springer Science+Business Media, New York Originally published by Springer-Verlag New York, Inc. in 2001.

2. Matthias Beck, Gerald Marchesi, Dennis Pixton , Lucas Sabalka, A First Course in Complex Analysis. Version 1.54.

3. Complex Analysis with Applications by N. Asmar and L. Grafakos

4.. М.А.Евграфов. Сборник задач по теории т.ф.к.п. 1972 г.

5.М.Л.Краснов, А.И.Киселев, Г.К. Макаренко. Функции комплексного переменного. Задачи и примеры. Москва, 2003, 204 ст.