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## Complex Mathematical Analysis Applied on Potential Theory and Dynamical Systems in Engineering Problems

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In this paper we will present the efficiency of the methods and the theoretical support which are applied at different courses and subject matters, showing the best learning way and the interaction of mathematics with new domains of research. These topics are indirect integrating in the post - university, post - graduate and doctoral courses - aligned to the European reform education, which we are adhering. The themes which are presenting are reeferers to:

1. Using the complex functions in the determining of the plane potential functions with singularities, these fields are encountered in hydrodynamics, electromagnetism, heat, symmetry theorems and potentials. The dynamical fields came in contact with screens, obstacles and the field lines modify. We will give a method for the determination of the new fields and the influence of the non-homogeneous environments.
2. Using the complex functions in elasticity are obtained new methods for the thermic potential
3. The determination of the potential spatial fields with axial symmetry knowing the potential plane fields which are generated with the complex functions.
4. Using the complex functions in the discrete dynamical systems to determine the stability criterion (the difference equations) very useful in biology, automatics, robotics, telecommunications . In this situation the dynamic of evolution occurs in the discreet time (the second, the hour, the day, the month, the year)
5. The inverse problems and the integral equations method in the optimization

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