Please write a review of the dissertation taking the following criteria into account, where appropriate:

- General remarks
- The significance and status of the dissertation in the field
- The sufficiency and quality of the material
- The adequacy of the methods used
- The validity of results
- The logic of the dissertation’s structure
- The knowledge and use of literature in the field
- The project’s contribution to the research area
- The author's input into the achievement of the dissertation results
- Language
- The shortcomings of the manuscript

Name of the PhD Candidate: Mr. ALEKSANDR MKRTCHYAN

Planned Date of Graduation: 13 October, year: 2015.

Title of the Dissertation: CONTINUATION OF POWER SERIES BY ENTIRE AND MEROMORPHIC INTERPOLATION OF COEFFICIENTS.
Would you please elaborate upon your review with reference to the above mentioned criteria in the box below. Please add extra pages if needed.

The notion of analyticity is central for complex analysis, and the problem of analytic continuation has a long history. In its classical formulation it asks about possible re-expansions of a Taylor series (in one variable) around points of the series’ convergence circle. The contemporary complex analysis takes this problem to another level and considers it in different settings: continuation of analytic sets, sheaves and so on. However, the study of this problem even in the classical setting is not over. Despite many deep and profound results by Hadamard, Polya, Szegő and others about continuation and continuability of power series in one variable still there is a room for further research to find criteria that allow effective verification. The rich and extensive theory (in one variable) makes this problem only harder and requires a sharp mind to advance it further. In several variables the problem becomes even more difficult and any new non-trivial result about continuation of power series is interesting.

The thesis addresses the problem of analytic continuation of power series in one and several variables. I find this attempt to attack the classical problem to be very successful, not only because of the quality and significance of the obtained results, but also the methods developed and employed in the investigations, as well as intricate constructions.

The first chapter is devoted to analytic continuation of power series in one variable. The standard approach in this situation so far was to consider entire functions interpolating coefficients of a power series. In terms of the growth indicator of this function Polya and Arakelian gave quantitative descriptions for domains (a sector, a neighborhood of an arc, the complex plane without an arc) where the series extends to. Instead of entire interpolating functions A.Mkrtchyan considers meromorphic functions and gives similar descriptions. A special attention is given to construct examples (Section 2) showing that meromorphic interpolation is more effective.

The other side of the problem of analytic continuation is the existence of non-extendable series. In Section 4 the author constructs a family of “moderately lacunar” series non-extendable beyond the unit circle, this strengthens Fredholm’s example by reducing the order of lacunarity.

The second chapter deals with the problem in several variables. Here the author presents two remarkable results: first on continuability of a multiple power series across a family of polyarcs, and second on continuability to a sectorial domain. In both cases the general method is the application of the multidimensional residue theory in the study of multidimensional Lindelöf integrals. One of difficulties in several variables is the absence of a universal growth indicator for entire functions. The author follows V.Ivanov and considers a geometric characteristic of the growth, a set called the boundary set of linear majorants, and uses it to formulate and prove theorems. It seems to be an interesting, albeit hard problem for future study to establish properties of such sets and find relation between them and properties of (classes of) entire functions in several variables.
To summarize, I find this dissertation very good, and its results valid and significant. The text is well structured, written clearly, in a good English. I recommend that the thesis submitted by Aleksandr Mkrtchyan to be accepted for defense and its author be awarded a PhD degree.

Name of the Dissertation Commission Member : Alexey Shchuplev

Chair / Function : Chair of Theory of Function
Date : 05.10.2015

Signature

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