Numerical analysis of the orbital effects within the dynamical mean field approach

$B.Radzimirski^a$ and $R.J.Wojciechowski^a$

^aA.Mickiewicz University, Faculty of Physics, 61-614 Poznań, Poland

We investigate the electronic structure of the strongly correlated electron systems with an orbital degeneracy within the framework of the iterated-perturbation theory (IPT)[1, 2] of the dynamical mean field method. We consider the multi-orbital Hubbard model in the limit of infinite lattice spatial dimensions. Our motivation comes from recent studies of the orbital effects in strongly correlated electron systems such as transition metal oxides, strontium ruthenates, manganities, and organic metals. Almost all of these materials consist of valence bands coming from d shells, where intra- and interorbital Coulomb interactions are equally important. The important part of the paper is a detailed discussion on the problem of the analytical continuation of the complex frequency Matsubara Grenn function from the Matsubara points to the real frequency axis. The analytical continuation is a nessessary step in the numerical calculations if we are interested in calculating the physical quantities such as the density of states or transport quantities.

References

- [1] 1. H.Kajueter and G.Kotliar, Phys.Rev.Lett.77, 131 (1996)
- [2] 2. T.Fujiwara, S.Yamamoto and Y.Ishii, J.Phys.Soc.Jpn. 72, 777 (2003)

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Corresponding author : R.J.Wojciechowski

Address for correspondence : Wydział Fizyki UAM, ul. Umultowska 85, 61-614 Poznań, Poland

Email address : wojrysz@amu.edu.pl

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