962-31-70   **Dmitry Khavinson*** (`dkhavin@nsf.gov`), National Science Foundation, Suite 1025, 4201 Wilson Blvd., Arlington, VA 22230. *Applications of Partial Differential Equations to Approximation by Harmonic and Analytic Functions in the Mean.* Preliminary report.

We consider the problem of finding the best harmonic or analytic approximant to a given function. We discuss when the best approximant is unique, and what regularity properties the best approximant inherits from the original function. All our approximations are done in the mean with respect to Lebesgue measure in the plane or higher dimensions. The problem of uniform approximation will also be considered. It will also be shown that these and related problems have deep, intrinsic connections to Partial Differential Equations and lead to several appealing, unsolved problems in Potential Theory. (Received July 20, 2000)