1086-35-1959 **Heather Rosenblatt*** (rosenblatt@math.ohio-state.edu), Department of Mathematics, The Ohio State University, 231 West 18th Ave, Columbus, OH 43210, and **Saleh Tanveer** (tanveer@math.ohio-state.edu), Department of Mathematics, The Ohio State University, 231 West 18th Ave, Columbus, OH 43210. *Existence, Uniqueness, Analyticity, and Borel Summability of Boussinesq and Magnetic Benard Equations.*

Through Borel summation methods, we analyze two different variations of the Navier-Stokes equation –the Boussinesq equation and the magnetic Benard equation. This method has previously been applied to the Navier-Stokes equation. We prove that an equivalent system of integral equations in each case has a unique solution, which is exponentially bounded for p in $\mathbb{R}^+$, p being the Laplace dual variable of $\frac{1}{t}$. This implies the local existence of a classical solution in a complex t-region that includes a real positive time (t)-axis segment. In this formalism, global existence of PDE solutions becomes a problem of asymptotics in the dual variable. Further, it is shown that within the time interval of existence, for analytic initial data and forcing, the solution remains analytic and has the same analyticity strip width. Under these conditions, the solution is Borel summable, implying that the formal series in time is Gevrey-1 asymptotic for small t. (Received September 24, 2012)