1086-34-2499 **Susmita Sadhu*** (susmita.sadhu@gcsu.edu) and **Joseph E Paullet**. *Asymptotic behavior of solutions of a BVP arising from fluid mechanics.*

The boundary value problem (BVP) governing a boundary layer flow past a suddenly heated vertical surface in a saturated porous medium is given by

$$f''' = \frac{2k+1}{3} f'^2 - \frac{k+2}{3} f f''$$
$$f(0) = 0, \quad f''(0) = -1, \quad f'(\infty) = 0,$$

where $k > -1$ is the temperature gradient exponent. Previous results have established the existence of a continuum of solutions for $-1 < k < -1/2$. In this talk, we will consider the asymptotics of these solutions. We will prove that for each $-1 < k < -1/2$, there exists a solution f_0 of the BVP that satisfies

$$f_0'(\eta) \sim c_0 f_0(\eta)^{-\frac{3(k+1)}{k+2}} \exp\left(- \int_{\eta_0}^{\eta} f_0(s)\ ds \right)$$

as $\eta \to \infty$ for some $\eta_0 > 0$ sufficiently large, and a constant $c_0 > 0$ that depends only on k and η_0. We conjecture that the BVP has exactly one solution that obeys the above asymptotics, i.e. its derivative decays to zero exponentially, while the derivatives of the other solutions decay to zero algebraically. If time permits we will also discuss uniqueness of solutions in the range $0 \leq k \leq 1$. (Received September 25, 2012)