1077-VJ-949 **Yuanyou F. Cheng*** (cfy1721@gmail.com), Waltham, MA. *Proof of the density hypothesis.*

The Riemann hypothesis, conjectured by Bernhard Riemann, claims that all nontrivial zeros of $\zeta(s)$ lie on the line $\Re(s) = \frac{1}{2}$. The density hypothesis is a conjectured estimate $N(\lambda, T) = O\big(T^{2(1-\lambda)+\epsilon}\big)$ for any $\epsilon > 0$, where $N(\lambda, T)$ is the number of zeros of $\zeta(s)$ when $\Re(s) \geq \lambda$ and $0 < \Im(s) \leq T$, with $\frac{1}{2} \leq \lambda \leq 1$ and $T > 0$. The Riemann-von Mangoldt Theorem confirms this estimate when $\lambda = \frac{1}{2}$, with T^{ϵ} being replaced by $\log T$. In an attempt to transform Backlund's proof of the Riemann-von Mangoldt Theorem to a proof of the density hypothesis by convexity, we discovered a slightly different approach utilizing a *pseudo Gamma function*. This function is devised to be symmetric with respect to $\Re(s) = \frac{1}{2}$. It is about the size of the Euler Gamma function on the right side of the line $\Re(s) = \frac{1}{2}$. Moreover, it is analytic and does not have any zeros and poles in the concerned open region. Aided by this function, we are able to establish a proof of the density hypothesis. Actually, our result is even stronger, when $\frac{1}{2} < \lambda < 1$, $N(\lambda, T) = O(\log T)$. (Received September 20, 2011)