1064-03-265 **Mingzhong Cai*** (yiyang@math.cornell.edu), Department of Mathematics, Cornell University, Ithaca, NY 14853. *A direct construction of a hyperimmune minimal degree.*

The existence of minimal Turing degrees was first proved by Spector, and the minimal degree constructed by Spector's method is hyperimmune-free. Sacks later gave a construction of a minimal degree below $\mathbf{0}'$, and all nonrecursive degrees below $\mathbf{0}'$ are automatically hyperimmune. Based on these facts, Miller and Martin then raised the question whether there is a hyperimmune minimal degree not below $\mathbf{0}'$.

Cooper answered Miller and Martin's question by using an indirect argument. He proved a jump inversion theorem for minimal degrees and used a result by Jockusch that if $\mathbf{d}' \geq \mathbf{0}''$ then $\mathbf{d}$ is hyperimmune. Therefore any minimal degree whose jump is high enough is then hyperimmune and not below $\mathbf{0}'$.

We revisited Miller and Martin's question after studying Lerman's question asking whether every $\overline{\mathbf{GL_2}}$ degree fails to have the finite maximal chain property. In fact we can show that a relativized version of Miller and Martin's problem is necessary in giving a negative answer to Lerman's question. We will present a direct construction of a hyperimmune minimal degree. The coding idea in this direct construction turns out to be an essential ingredient in our solution to Lerman's problem. (Received September 12, 2010)