1145-03-1700 **Xizhong Zheng*** (zhengx@arcadia.edu), Department of Computer Science and Mathematic, Arcadia University, 450 S. Easton Road, Glenside, PA 19038. *Weak Computabilities of Real Numbers and Relative Randomness.*

A real x is *computable* if it is the limit of an effectively convergent computable sequence of rationals. If the effective convergence is replaced by weaker conditions, various weak computabilities can be introduced. For example, if the convergence is *weakly effectively*, then the limit is *d.c.e.*; if the convergence is *divergence bounded*, then the limit is *d.b.c.* The weak computabilities are closely related to relative randomnesses described by the Solovay reduction. The Solovay reduction originally defined only for the c.e. reals can be extended as follows. (A). $x \leq_S^1 y$ if there are two computable sequences (x_s) and (y_s) of rational numbers which converge to x and y, respectively, such that $|x - x_s| \leq c(|y - y_s| + 2^{-s})$ for some constant c and for all s. (B). $x \leq_S^2 y$ if there are two computable sequences (x_s) and (y_s) of rational numbers which converge to x and y, respectively, and there is a computable function h such that $|y - y_s| \leq 2^{-h(n)} \Longrightarrow |x - x_s| \leq 2^{-n}$ for all s and n. We will show that, the c.e. random reals are $\leq_S^1$-complete and $\leq_S^2$-complete for the classes of d.c.e. reals and d.b.c. reals, respectively. (Received September 24, 2018)