1135-93-1523 **Hanbaek Lyu*** (colourgraph@gmail.com), 231 W 18th ave, Columbus, OH 43210. *Global synchronization of pulse-coupled oscillators on trees.*

Consider a distributed network on a simple graph $G = (V, E)$ with diameter d and maximum degree Δ, where each node has a phase oscillator revolving on $S^1 = \mathbb{R}/\mathbb{Z}$ with unit speed. Pulse-coupling is a class of distributed time evolution rule for such networked phase oscillators inspired by biological oscillators, which depends only upon event-triggered local pulse communications. In this paper, we propose a novel inhibitory pulse-coupling and prove that arbitrary phase configuration on G synchronizes by time $51d$ if G is a tree and $\Delta \leq 3$. We extend this pulse-coupling by letting each oscillator throttle the input according to an auxiliary state variable. We show that this adaptive pulse-coupling synchronizes arbitrary initial configuration on G by time $83d$ if G is a tree. As an application, we obtain a universal randomized distributed clock synchronization algorithm, using $O(\log \Delta)$ memory per node with $O(|V| + (d^5 + \Delta^2) \log |V|)$ expected worst case running time. (Received September 22, 2017)