Discontinuous percolation transition in hidden in continuous percolation transition

YOUNG SUL CHO, BYUNGNAM KAHNG, Seoul National University — Diffusion limited cluster aggregation model is the well known model which describes the aggregation of diffusive clusters. In this model, time $t$ is defined so as to describe the situation in which clusters follow Brownian motion. Thus $t$ defined in this model can be regarded as real time. In this presentation, we introduce a new variable $p$ which increases as much as $\delta p = 1/N$ whenever two distinct clusters aggregate. We use $p$ instead of $t$ to study a percolation problem in diffusion limited cluster aggregation model. Then, we find that a discontinuous percolation transition occurs if we observe the growth of the largest cluster as a function of the transformed variable $p$. This result implies that a continuous percolation transition can be observed as a discontinuous percolation transition when a controlled parameter is changed.