1078-82-206 **Kyoichi Tsurusaki*** (turusaki@kanagawa-iri.go.jp), 705-1,Shimoimaizumi, Ebina, Kanagawa 243-0435, Japan. *General polygonal length dependence of the linking probability for ideal random polygons.*

We discuss the linking probability, $P_{\rm link}$, that two ideal random polygons (RPs) are topologically entangled. $P_{\rm link}$ is a function of the distance between two RPs, R, and the polygon length, N. We have shown that the scaling behavior of $P_{\rm link}$ can be expressed by a simple function: $P_{\rm link}(\xi;N) = \exp\left(-\kappa_1\xi^{\mu_1}\right) - C\exp\left(-\kappa_2\xi^{\mu_2}\right)$, where ξ is the ratio of R to the radius of gyration R_g : $\xi = R/R_G$. The values of κ_1, μ_1, κ_2, μ_2 and C have been numerically evaluated for RPs with discrete values of N from 32 to 512. Considering physical requirements of $P_{\rm link}$ in two limits of $N \to 0$ and $N \to \infty$, we can derive six constraints between these parameters. By taking account of both the numerical data and the constraints, we propose function forms of $\kappa_1(N)$, $\mu_1(N)$, $\kappa_2(N)$, $\mu_2(N)$ and $C(N)$. As a consequence, we can calculate $P_{\rm link}$ for not only a finite value of N but also $N \to \infty$. We also introduce an application of this result to the ring polymer system. (Received December 07, 2011)