The Stirling number of the second kind \[ \{n\choose k} \] counts the number of partitions of a set of size \( n \) into \( k \) non-empty sets. A graph theoretic interpretation of this quantity — the number of partitions of the empty graph of order \( n \) into \( k \) non-empty independent sets — admits an obvious generalization to arbitrary graphs. A more analytic interpretation — the coefficient of \( x^k \) in the polynomial \( p(x) \) defined by \( (x\frac{d}{dx})^n e^x = p(x)e^x \) — also admits a natural generalization, with \( (x\frac{d}{dx})^n \) replaced by an arbitrary word in the alphabet \( \{x, d/dx\} \). This latter generalization is the Weyl algebra normal ordering problem.

I’ll show how these two generalizations are closely related, and give a simple graph theoretic answer to the normal ordering problem. In part joint work with J. Engbers and J. Hilyard. (Received August 01, 2013)