1056-92-1412   **Chang Hyeong Lee*** (`chlee@unist.ac.kr`), Mechanical and Advanced Materials Engineering, UNIST, 100 Banyeon-ri,Eonyang-eup,Ulju-gun, Ulsan City, 689-798, South Korea. *A moment closure method for stochastic biochemical networks.*

If a stochastic biochemical network contains nonlinear reactions, it is difficult, if not impossible, to find a solution of the chemical master equation for the network. Thus, researchers often resort to finding the first moment or mean and the second central moment or covariance instead of the probability distribution, since they give decent description for the stochastic dynamics such as average quantity and fluctuation. However, due to the nonlinear reactions, the equations for any moments always include higher moment terms. As a result, to find the two lowest moments, one has to deal with an infinite dimensional system of ODEs for all moments. In this talk, we present a moment closure method that approximates an infinite dimensional ODE system for the moments by a finite dimensional ODE system. We derive an infinite dimensional ODE system for all moments and by truncation of the infinite dimensional system at certain moments, we obtain a finite dimensional ODE system. Applying conventional numerical schemes to the truncated system, we obtain numerical approximation for the two lowest moments. Furthermore, we estimate the errors generated by this approximation in a rigorous way. Lastly, we present examples to show numerical accuracy and efficiency of the approximation. (Received September 21, 2009)

1