1086-39-1107 **Ummugul Bulut*** (gul.bulut@ttu.edu), 8908 Dixon ave, Lubbock, TX 79423, and **Edward J. Allen** (edward.allen@ttu.edu), Texas Tech University, Department of Mathematics, Broadway and Boston, Lubbock, TX 79409. *Derivation of stochastic differential equations for macroevolutionary process.*

Deterministic and stochastic systems of ordinary differential equations are derived that describe the evolutionary dynamics of genera and species. Two different hypotheses are made in the model construction; the rate of change of the number of genera is either proportional to the number of genera in the family or is proportional to the number of species in the family. The first set of assumptions is the same as those used by Yule in his probabilistic study of macro evolutionary process. Asymptotic and exact numbers of species per genera are formulated for both models. Computational results for the derived systems of ODEs and SDEs agree well with the observed results for several families. Moreover, for each family, SDE models yield estimates of variability in the processes which are difficult to obtain using classical methods to study the dynamics of species and genera formation. (Received September 19, 2012)