1145-34-1554 **Emre Esenturk*** (e.esenturk.1@warwick.ac.uk), Mathematics Institute, University of Warwick, Coventry, CV4 7AL, United Kingdom. *Mathematical theory of exchange-driven growth: Fundamentals and asymptotic behavior.*

Exchange-driven process (EDP) is a mechanism where clusters of (constituent elements of) a system interact with each other by exchanging single unit-element at a time. Examples include models population dynamics, wealth exchange etc. In this talk we present first rigorous results for the mean field rate equations of this process. We show two different types of behavior depending on the symmetry of K(j, k), the interaction kernel. For the non-symmetric case, we show global existence and uniqueness of solutions for kernels satisfying K(j, k) $\leq$ C j k. This result is optimal in the sense that we show for a large class of initial conditions and kernels satisfying K(j, k) $\geq$ C j^{β} ($\beta > 1$) the solutions cannot exist. On the other hand, for symmetric kernels solutions exist globally for K(j, k) $<$ C((j^{μ}) (k^{ν}) + (j^{ν}) (k^{μ})) (μ, $\nu \leq 2$, $\mu + \nu \leq 3$), while existence is lost for K(j, k) $\geq$ C j^{β} ($\beta > 2$). In the intermediate regime $3 < \mu + \nu < 4$, we can only show local existence. We also present results on EDP with the possibility of breakages from massive clusters. We show that the classical indefinite growth trend is broken and the system approaches to an equilibrium even without the inclusion of a sink. (Received September 23, 2018)