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Artem Novozhilov and **Georgy Karev**. *Newton diagram methods for analysis of the replicator equation.*

The replicator equation is at heart of many areas of mathematical biology. For each replicator equation the corresponding selection system can be considered for which effective methods of analysis were recently suggested [Karev,2009]. The original problem is reduced to the analysis of asymptotic behavior of the solutions of the so-called escort system, which in some important cases can be of smaller dimension than the original one. We apply the method of the Newton diagram [Berezovskaya,1979] to study the asymptotic behavior of the solutions of the escort system, when matrix A has rank 1 or 2. We analyze an arbitrary replicator equation with the matrix of rank 1 and, in particular, provide the conditions when the asymptotic state is an inner equilibrium. As an example of the system with rank 2 we consider the problem from [Adams & Sornborger,2007], for which we show, for arbitrary dimension of the system and under some suitable conditions, that generically one globally stable equilibrium exists on the 1-skeleton of the simplex. (Received September 22, 2009)