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The Chapman – Enskog procedure for an age-structured population model: initial, boundary and corner layer corrections. (English) Zbl 1107.92043

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Summary: We consider a mathematical model of an age-structured population of some fisheries (for example, anchovies, sardines or soles). Two time scales are involved in the problem: the fast time scale for the migration dynamics and the slow time scale for the demographic process. At a first step, we study the so called ‘aggregated’ system by means of semigroup theory. Then, we study the asymptotic behaviour of the model by using the Chapman – Enskog procedure. In particular, we study initial, boundary and corner layer effects in order to obtain the exact initial and boundary conditions the approximated solution has to satisfy.

MSC:

- [92D25](#) Population dynamics (general)
- [47D03](#) Groups and semigroups of linear operators
- [35Q92](#) PDEs in connection with biology, chemistry and other natural sciences
- [47N60](#) Applications of operator theory in chemistry and life sciences
- [47F05](#) General theory of partial differential operators

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Keywords:

population model; semigroup theory; aggregation method; singular perturbation methods; initial, boundary and corner layers

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