

# An age-structured epidemic model for the demographic transition

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In this talk, we consider an age-structured epidemic model for the demographic transition in which we assume that the cultural norms leading to lower fertility are transmitted amongst individuals in the same way as infectious diseases. First, we formulate the basic model as an abstract homogeneous Cauchy problem on a Banach space to prove the existence, uniqueness, and well-posedness of solutions. Next based on the normalization arguments, we investigate the existence of nontrivial exponential solutions and then study the linearized stability at the exponential solutions using the idea of asynchronous exponential growth. The relative stability defined in the normalized system and the absolute (orbital) stability in the original system are examined. For the boundary exponential solutions corresponding to infection-free or totally infected status, we formulate the stability condition using reproduction numbers. We show that bi-unstability of boundary exponential solutions is one of conditions which guarantee the existence of coexistent exponential solution, which does not appear in the age-independent model.

## References

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\*Mini-Symposium: Two-sex and other multi-species interactions in ecology and human population dynamics