A Delayed Epidemic Model of *Bovine Viral Diarrhea*

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Bovine Viral Diarrhea (BVD) is an important cattle disease due to its global prevalence and its economic implications [1]. In the past, composite models describing the dynamics of BVD have been developed, leading to multi-compartment systems with a long list of associated parameters [2]. In this work we model the disease as a *SIR (Susceptible-Infected-Recovered)* model with an additional self-sustained, *persistently infected* (PI) class, which is pertinent to the descriptive BVD mechanisms. The particularity of the disease leads to newborn calves entering either the class of permanent immunity (recovered) or the PI class, should a pregnant cow undergo the disease. To model this feature we incorporate a distributed delay in the system following the formulation of [3]. We then present results on the numerical integration of the system employing meaningful parameters from the literature [2], and finally aspects of the system's stability.

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