1100-65-172 **Jean M.S. Lubuma*** (jean.lubuma@up.ac.za), Dept of Mathematics and Applied Mathematics, University of Pretoria, Pretoria, 0002, South Africa, and **Yibeltal A Terefe**, Dept of Mathematics and Applied Mathematics, University of Pretoria, Pretoria, 0002, South Africa. *A nonstandard finite difference scheme for the SIS-Volterra integral equation model.*

We follow P. van den Driessche and J. Watmough (*J. Math. Biol.*, **40** (2000), 523-540): the contact rate is a function of the infective population and the period of infectivity is incorporated into the model by considering the SIS-Volterra integral equation. Unlike the classical SIS-model, where the value $\mathcal{R}_0 = 1$ of the basic reproduction number is a forward bifurcation, there exist two threshold parameters $\mathcal{R}_0^c \leq \mathcal{R}_0^m$, $\mathcal{R}_0^m \geq 1$, and the considered model can undergo a backward bifurcation as follows. The disease-free equilibrium (DFE) is the only equilibrium and it is globally asymptotically stable (GAS) when $\mathcal{R}_0 < \mathcal{R}_0^c$; there exists only one endemic equilibrium (EE), which is locally asymptotically stable (LAS) when $\mathcal{R}_0 > \mathcal{R}_0^m$ with DFE being unstable when $\mathcal{R}_0 > 1$; for $\mathcal{R}_0^c < \mathcal{R}_0 < 1$, the DFE is LAS and co-exists with at least one LAS endemic equilibrium. We design a NSFD scheme that preserves positivity and boundedness of the solution as well as the stability properties of equilibria. (Received February 09, 2014)