[mex112] Balancing the water level in a cone

Water flows into a cone-shaped container at a constant rate (volume per unit time) and evaporates at a rate proportional to the free surface area. (a) Determine the equilibrium position of the water level, expressed as the volume V_{eq} at which the two processes are in balance. (b) Determine whether or not that stationary state is asymptotically stable. (c) Produce a graph of V/V_{eq} versus t for $0 \leq t \leq 8$ and $k_1 = 1$ for the case where the container is empty initially.

Solution: