

URGENT:

Math 0290 *Differential Equations* - RUBIN - January 16, 2009

We are being asked by the EPA to provide the new administration with guidance on a delicate situation. A factory has applied to dump chlorine contaminated water into a lake, at an undisclosed location but with volume 10^6 gallons, for the next month. The waste stream comes out of the factory at 0.5 gal/min. A clean river feeds the lake at a rate of 9.5 gal/min, and another river drains the lake at a rate that keeps the lake volume constant. EPA biologists have determined that chlorine levels of up to 7000 g in the lake are environmentally tolerable, while the current level is 1000g. We are asked to determine what range of chlorine concentrations within the factory waste will keep the total chlorine in the lake below 7000 g. Additionally, we should determine the concentration that will keep the total at 1000 g.