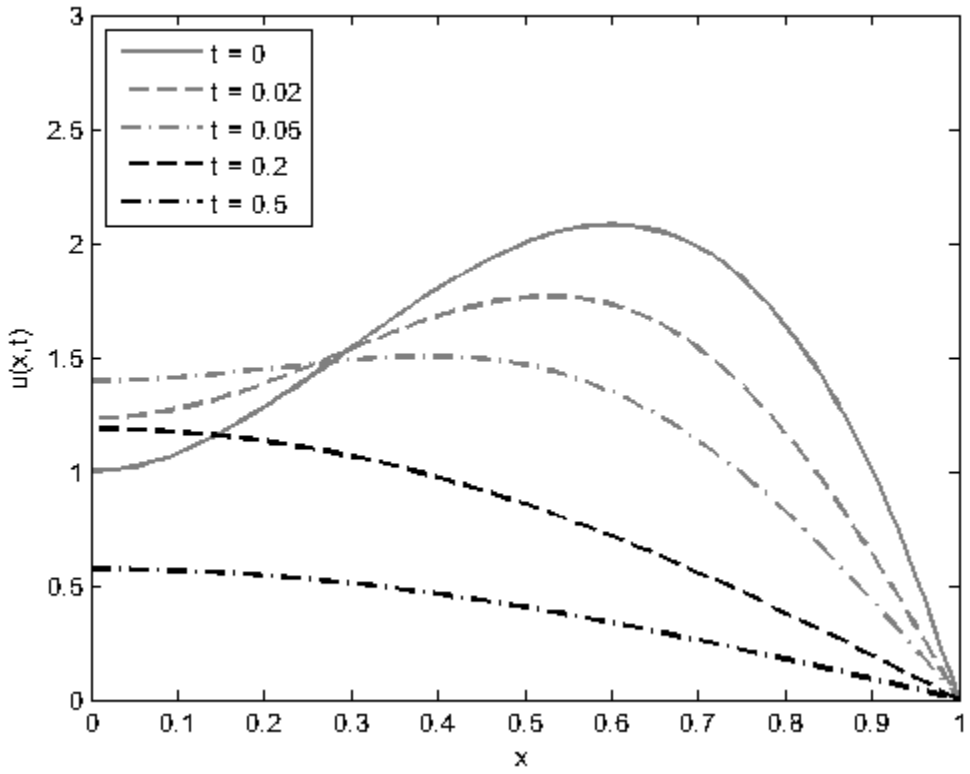
Solutions for HW1

1.

$u(x,t) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right) \exp\left[-\left(\frac{n\pi}{2}\right)^2 t\right]$, where the summation is over <u>odd values of *n*</u> only

and

$$a_n = \frac{\int_0^1 (-10x^2 + 9x^2 + 1)\cos\left(\frac{n\pi x}{2}\right) dx}{\int_0^1 \left[\cos\left(\frac{n\pi x}{2}\right)\right]^2 dx}$$, for <u>odd values of *n*</u> only.



2. $u(x,t) = 2\exp(\pi^2 t) + 3\cos(\pi x) + 7\cos(4\pi x)\exp(-15\pi^2 t)$

3. $u(x,t) = 5\sin(3\pi x)(1+t)^{-9\pi^2}$

4. Will be discussed in class

5. (a) Will be discussed in class. (b) Steady state is $u_s(x) = 2$ over the entire interval.