## **Assignment 1** *(Numerical Methods-Scott Zhang)*

Fraction $\frac{2}{2-x}$ can be represented by the following infinite series

$$\frac{2}{2-x} = 1 + \frac{x}{2} + (\frac{x}{2})^2 + (\frac{x}{2})^3 + ...(\frac{x}{2})^{n-1} + ... \qquad (\left|\frac{x}{2}\right| < 1)$$

and can hence be approximated as

$$\frac{2}{2-x} \approx \sum_{0}^{k} (\tfrac{x}{2})^n .$$

1. For the fraction corresponding to $x = 0.2$, calculate the approximations to the fraction and the resulted relative deviations, when $k$ is 4, 5, 6 and 7, respectively.

2. Repeat the calculations in question 1 for $x = 0.4, 0.6$ and $0.8$, respectively.

Requirements

1. Write a program using a language of your choice to carry out all the calculations.
2. Submittal should include 1) tabulated results, and 2) a print of the program.
3. The results of approximations are rounded to 6 decimal digits, and the results of relative deviations are expressed using scientific notation.
4. Due date: Sept. 13, 2012