

Ay190 – Worksheet 10 - BVP  
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## 1 Shooting Method

### 1.1 Forward Euler

With FE method and number of points = 10, we compare the result. Even though values at the boundary points match pretty well, our result doesn't do very well at other points.

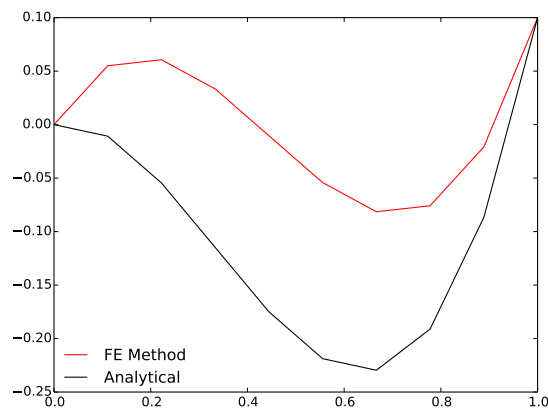


Figure 1: Comparing result from FE with the analytical solution with number of points = 10

### 1.2 RK2

With RK2 method and number of points = 10, our result is so close to the analytical answer that, if plot together, it's hard to distinguish. Thus, in figure 2, I plot the error at each point in  $x$ . The magnitude of error is around  $10^{-16}$ .

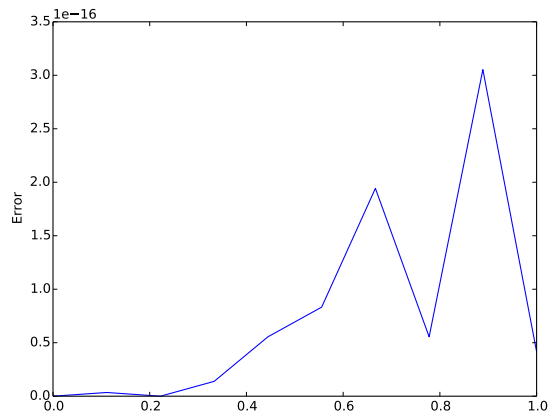


Figure 2: Showing error between result from RK2 and the analytical answer.

### 1.3 Convergence Plot

We can see that the error for FE drops as the expected rate. However, the error for RK2 remains pretty flat.

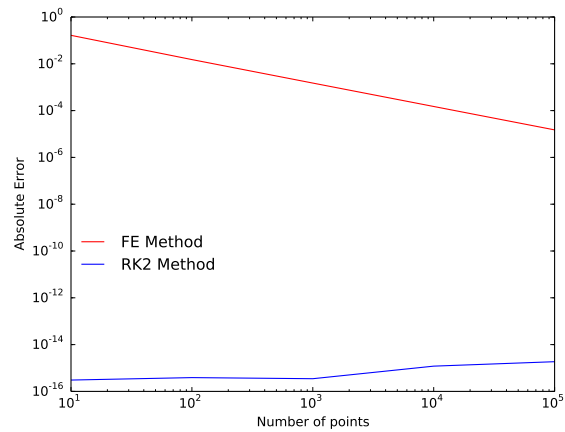


Figure 3: Convergence of two methods