CHAPTER VI

CONCLUSION

In this work, we used standard residual technique to derive a posteriori error estimate for semi-linear parabolic PDEs. From the results in upper and local lower bound, we see the true errors that occur in the system come from the approximation of the time derivative, from the finite element space and from the nonlinear function f. We control the errors by using adaptive technique on time and space. But the error from the nonlinear function, we use Lipschitz condition in order to absorb this error to the error in the system.

From the upper bound, it shows that we can control the total error by controlling the error indicators and estimators from time and space. The local lower bound shows that the local error can be controlled by controlling the local error indicators; we can reduce the local errors by refining elements with high error indicators, assuming that the oscillation and error from nonlinear function f are small. We finally use the result from the upper and local lower bounds to design an adaptive algorithm to control the error in the system based on time and space error indicators.