CHAPTER I
INTRODUCTION

Fluidization has been widely used industrially because of its continuous powder handling ability and its good heat and mass transfer characteristics (Gidaspow, 2002). Gidaspow (1994) showed many applications in a riser and the bubbling fluidized beds using the kinetic theory of granular flow based on the kinetic theory of dense gas (Chapman and Cowling, 1970). The granular temperature, which is like the thermal temperature in kinetic theory of gases, was basic concept in kinetic theory of granular flow. It was defined as the mean of the squares of a particle velocity fluctuation.

The measured granular temperatures needed for verification of CFD simulation for multiphase flow. Good measurement of such granular temperatures was scarce. The objectives of this study were to measure a granular temperature of particles in the gas solids flows using IIT's CCD camera and to do simulation by using Fortran program. The result of this simulation showed in MatLab program.

The experiment was performed in an IIT's two-dimensional fluidized bed with 530 μm glass beads and found the velocity of glass bead in the bubble to calculate solid concentration, axial and tangential velocity, Reynolds stress, and shear stress. This technique uses CCD camera, which the Particle Image Velocity (PIV) method was described by Gidaspow et al. (1996). After that would run simulation by using IIT code to compare the results from the experiment data. This IIT code composed of IIT hydrodynamic models and computer code, which the fundamental of hydrodynamics was explained on "Multiphase Flow and Fluidization, Continuum and Kinetic Theory Descriptions" by Dimitri Gidaspow (1994). The program used model A and model B in Gidaspow's book (1994) and calculate the pressure drop in the continuous phase. The model B was unconditionally well posed, which was different from model A. The experiment obtained the velocity of the glass beads and Reynolds stresses in the bubble. The bubble size and the bubble velocity were found as well. These data would be compared with the IIT hydrodynamic model.