Determination of Hydrodynamic Parameters on Two–Phase Flow Gas - Liquid in Pipes with Different Inclination Angles Using Image Processing Algorithm GUSTAVO MONTOYA, MARÍA VALECILLOS, CARLOS ROMERO, DOSINDA GONZÁLES — In the present research a digital image processing-based automated algorithm was developed in order to determine the phase's height, hold up, and statistical distribution of the drop size in a two-phase system water-air using pipes with $0°$, $10°$, and $90°$ of inclination. Digital images were acquired with a high speed camera (up to 4500fps), using an equipment that consist of a system with three acrylic pipes with diameters of 1.905, 3.175, and 4.445 cm. Each pipe is arranged in two sections of 8 m of length. Various flow patterns were visualized for different superficial velocities of water and air. Finally, using the image processing program designed in Matlab/Simulink$^{®}$, the captured images were processed to establish the parameters previously mentioned. The image processing algorithm is based in the frequency domain analysis of the source pictures, which allows to find the phase as the edge between the water and air, through a Sobel filter that extracts the high frequency components of the image. The drop size was found using the calculation of the Feret diameter. Three flow patterns were observed: Annular, ST, and ST&MI.

Gustavo Montoya