CAP5415 Computer Vision

Assignment # 4

1. Derive the basic equations of the motion field

$$u = v_x = \frac{V_{T_Z} x - V_{T_X} f}{Z} - \omega_Y f + \omega_Z y + \frac{\omega_X xy}{f} - \frac{\omega_Y x^2}{f}$$

$$v = v_y = \frac{V_{T_Z} y - V_{T_Y} f}{Z} + \omega_X f - \omega_Z x - \frac{\omega_Y xy}{f} + \frac{\omega_X y^2}{f}$$

2. Assuming planar scene and perspective projection, derive the equations for flow field, *u, v,* i.e.

$$u = v_x = a_1 + a_2 x + a_3 y + a_4 x^2 + a_5 xy$$

$$v = v_y = a_6 + a_7 x + a_8 y + a_4 xy + a_5 y^2$$

Also state the expression for each parameter a_i.