

# test\_modele\_dynamique

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February 12, 2014

```
In [1]: import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

In [2]: from parametres import sliders, VPs, volume, p, kinects_network_config, d_x, d_y, d_z,
from modele_dynamique import Scenario, xyz2azel
events = [0, 0, 0, 0, 0, 0, 0, 0] # 8 types d'événements
print p['N']

DEBUG parametres , position croix: [ 0.           3.76999998  1.37
]
32

def simulpos(s, t, players):
    positions = []
    for player in players:
        positions.append([player['center'][0] + player['amp'][0]*np.cos(2*np.pi*t/play
            player['center'][1] + player['amp'][1]*np.cos(2*np.pi*t/play
            player['center'][2] + player['amp'][2]*np.cos(2*np.pi*t/play

    return positions

def simul(p, players, dt=.01, t_stop=60., s_VP = 0,
         display=True, polar=False):
    time = np.arange(0., t_stop, dt)
    N_time = len(time)
    n_players = len(players)
    positions_ = np.zeros((3, n_players, N_time))
    particles = np.zeros((6, p['N'], N_time))
    s = Scenario(p['N'], scenario, volume, [VPs[0]], p, calibration)
    for i_t, t in enumerate(time):
        positions = simulpos(s, t, players)
        positions[:, :, i_t] = np.array(positions).T
        s.do_scenario(positions=positions, events=events, dt=dt)
        particles[:, :, i_t] = s.particles[0:6, s_VP*s.N:(s_VP+1)*s.N]
    if display:
        fig = plt.figure(figsize=(18,10))
        T_step = max(N_time / 100, 1)
        if polar:
            rae_PC = xyz2azel(positions_, np.array([VPs[0]['x'],
                VPs[0]['y'],
                VPs[0]['z']]))
            rae_VC = xyz2azel(particles[:, :, :], np.array([VPs[0]['x'],
                VPs[0]['y'],
                VPs[0]['z']]))

            for i_ax, axe in zip(range(3), ['r', 'a', 'e']):
                ax = fig.add_subplot(3, 1, 1+ i_ax)
                ax.plot(time, rae_PC[i_ax, :, :].T, '--')
                ax.plot(time[::T_step], rae_VC[i_ax, :, ::T_step].T, alpha=.5)
                #ax.errorbar(time[::T_step], particles[i_ax, :, ::T_step].mean(axis=0),
                #ax.errorbar(time[::T_step], particles[i_ax + 3, :, ::T_step].mean(axis=0),
                ax.set_ylabel(axe)

        else:
```

```

for i_ax, axe in zip(range(3), ['x', 'y', 'z']):
    ax = fig.add_subplot(3, 1, 1+i_ax)
    ax.plot(time, positions_[i_ax, :, :], T, '--')
    ax.plot(time[::T_step], particles[i_ax, :, ::T_step].T, alpha=.5)
    #ax.errorbar(time[::T_step], particles[i_ax, :, ::T_step].mean(axis=0)
    #ax.errorbar(time[::T_step], particles[i_ax + 3, :, ::T_step].mean(axis=0)
    ax.set_ylabel(axe)
    ax.set_xlabel('time')
return positions_, particles

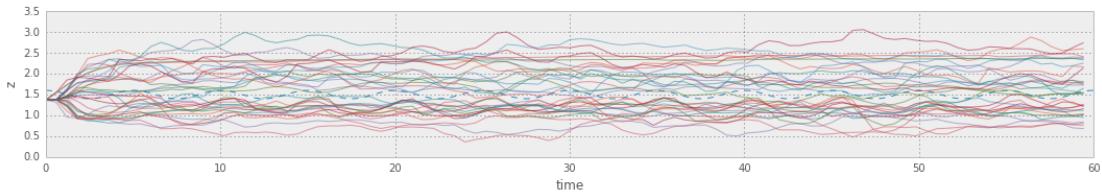
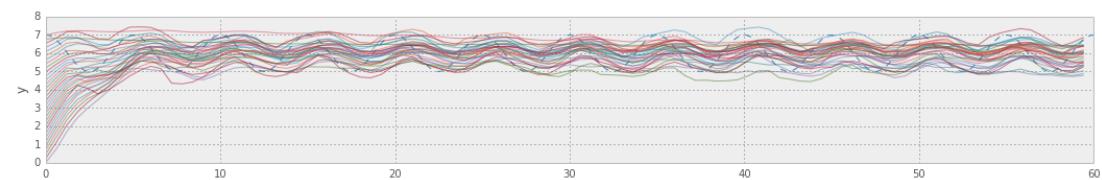
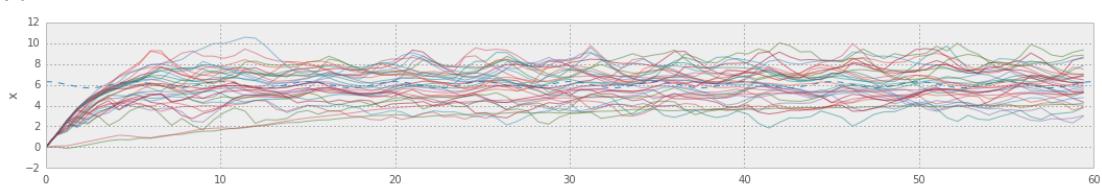
```

## 1 stabilité avec paramètres

```

In [9]: roger = [6., 6, 1.5]
players = [{center: roger, 'amp': [.3, 1., .1], 'T': 5.}]
print p['damp']
pos, particles = simul(p, players)
0.1

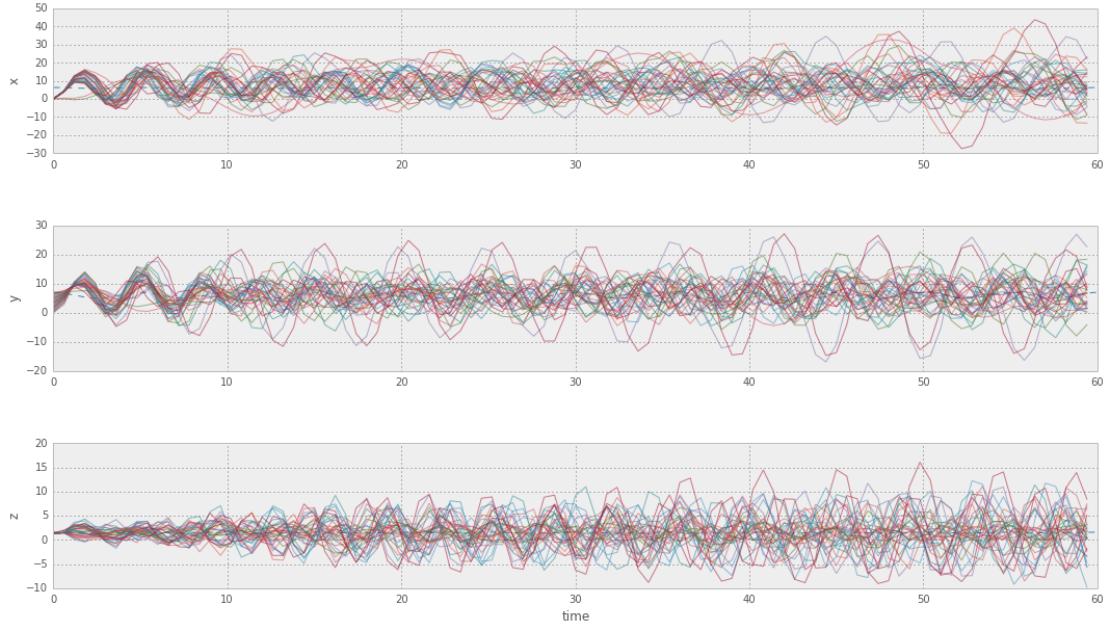
```



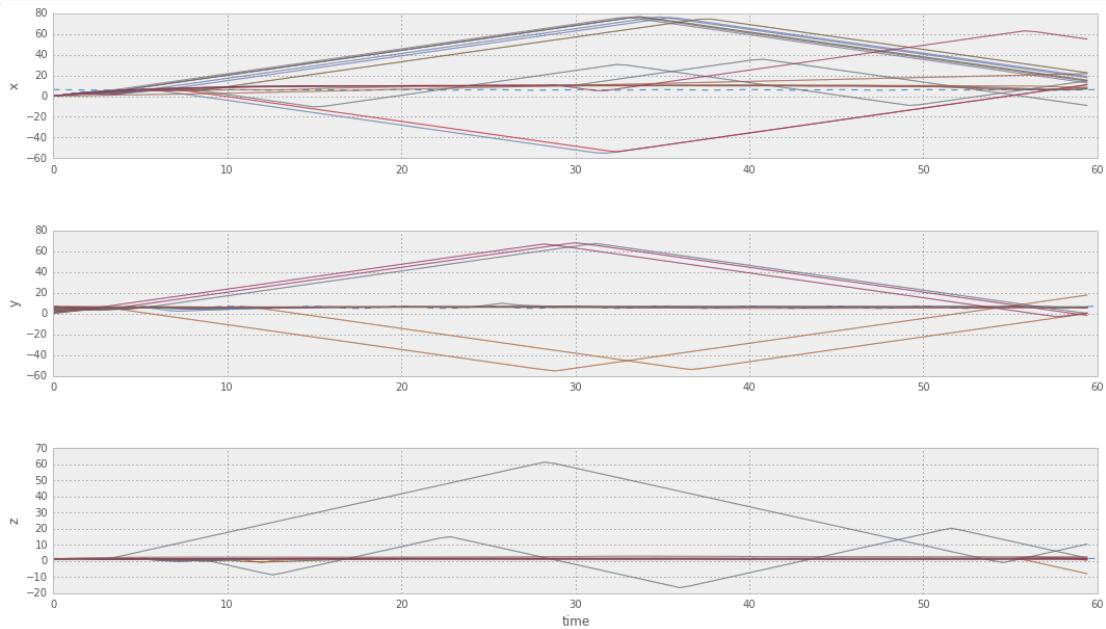
```

In [10]: p_ = p.copy()
p_['damp'] = .0
print p_['damp']
pos, particles = simul(p_, players)
0.0

```



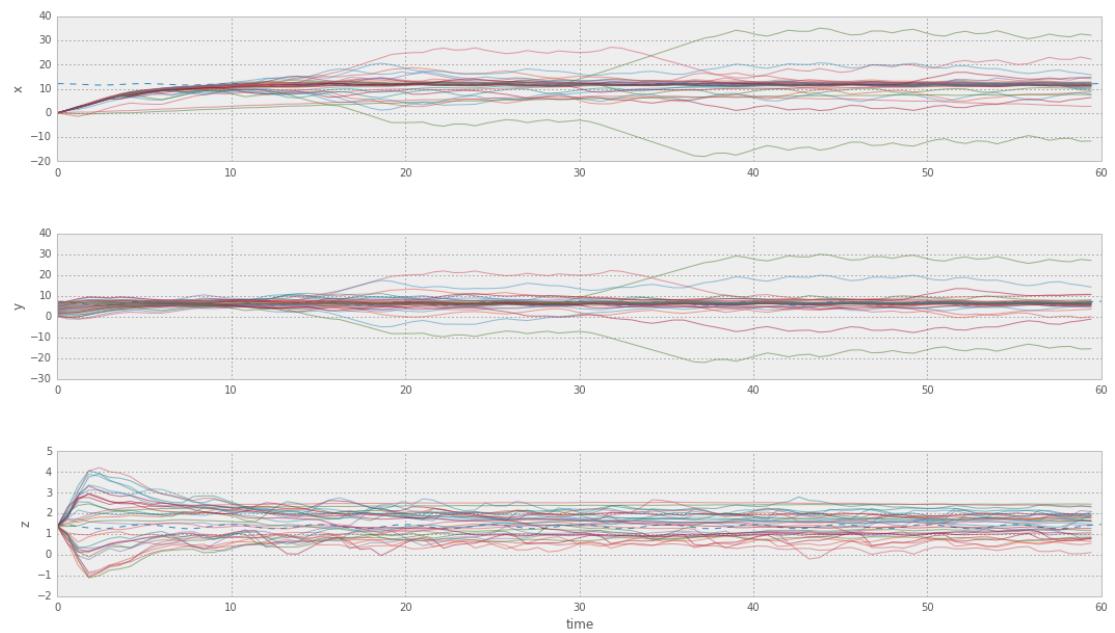
```
In [11]: p_ = p.copy()
p_['G_repulsion'] = 0.
pos, particles = simul(p_, players)
```



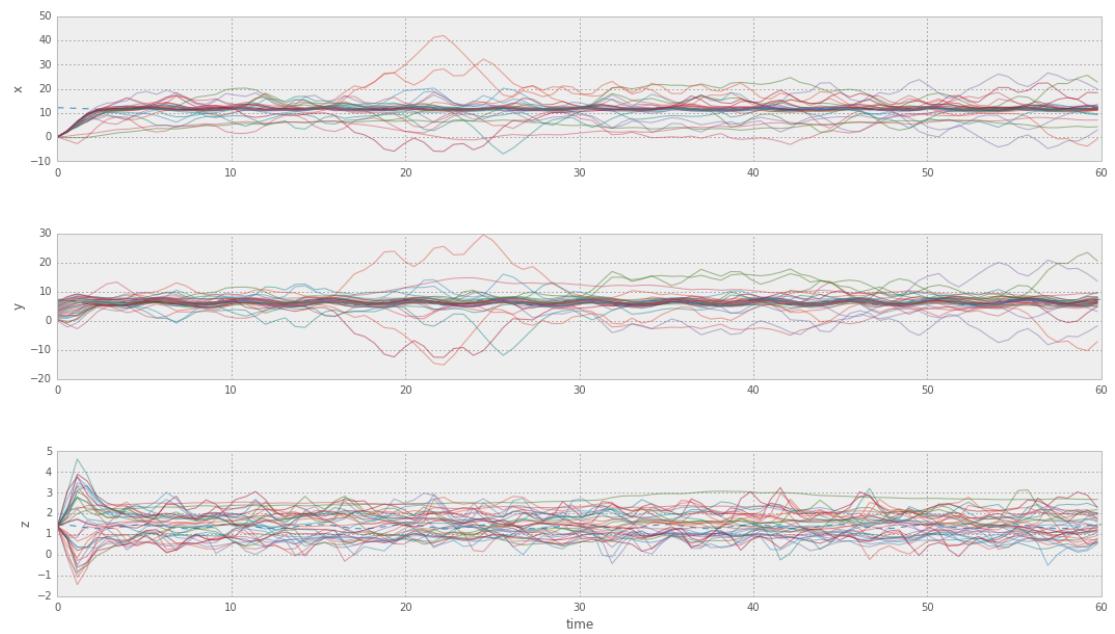
## 1.1 stabilité avec dt

```
In [15]: for dt in np.logspace(-2., 2., 8, endpoint=False):
    print 'dt = ', dt
    players = [{center: [VPs[0]['x'] + 1., VPs[0]['y'], VPs[0]['z']], 'amp': [.3, 1.]}
    pos, particles = simul(p, players, dt=dt)
    plt.show()
```

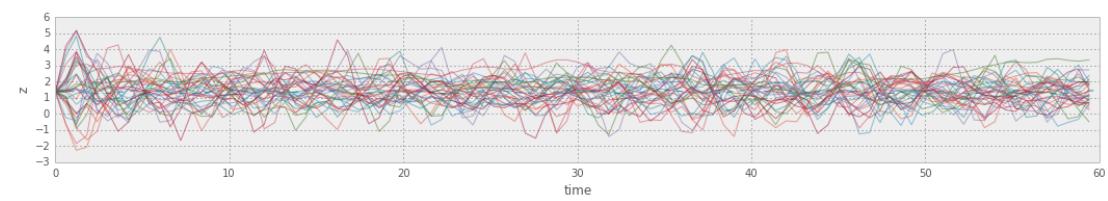
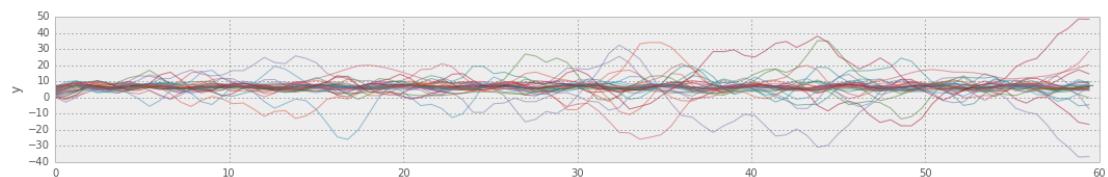
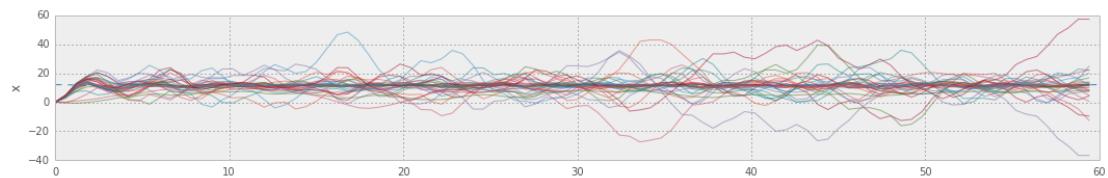
$dt = 0.01$



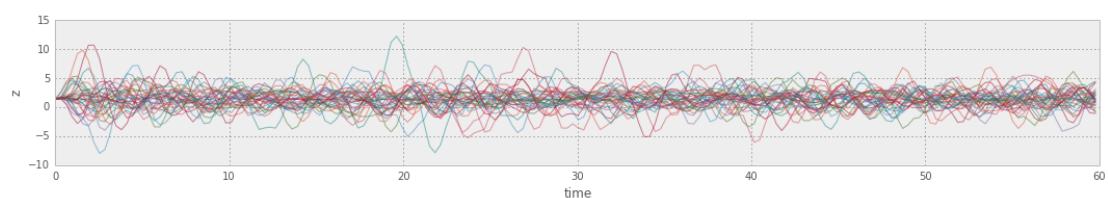
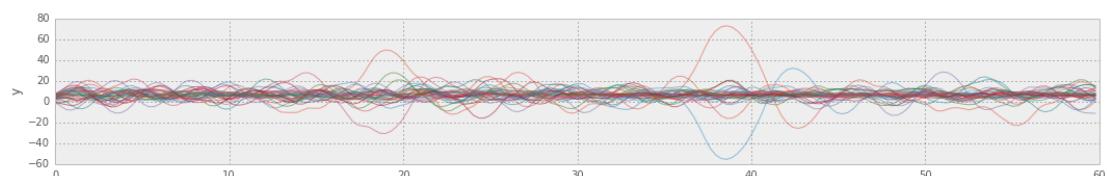
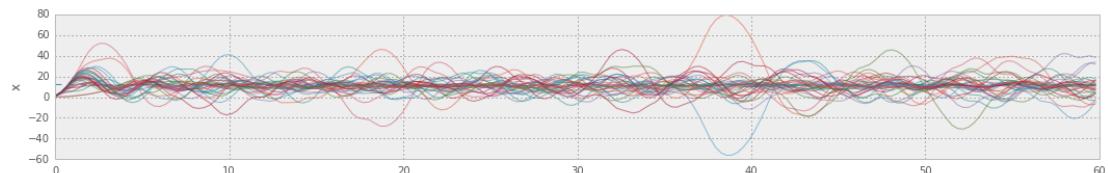
$dt = 0.0316227766017$



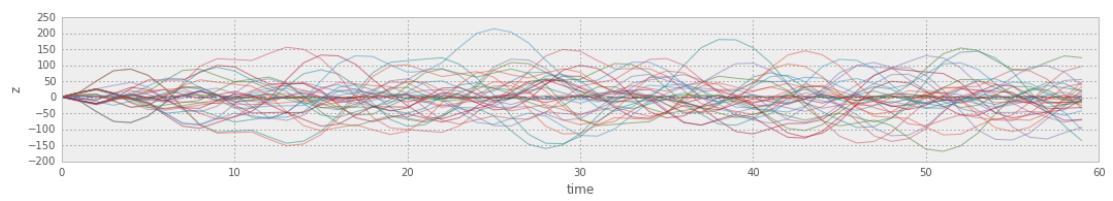
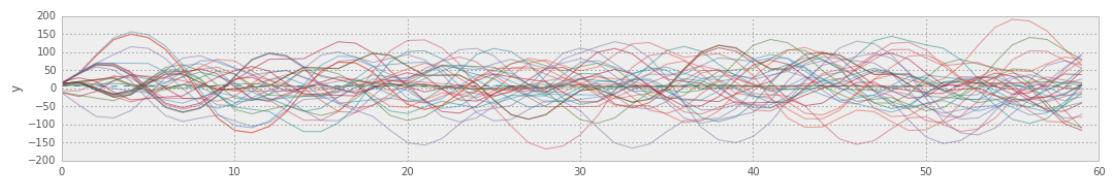
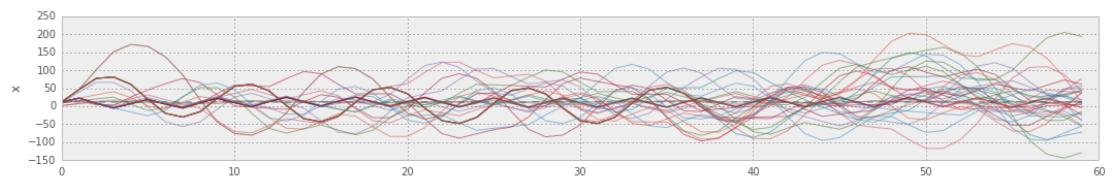
$dt = 0.1$



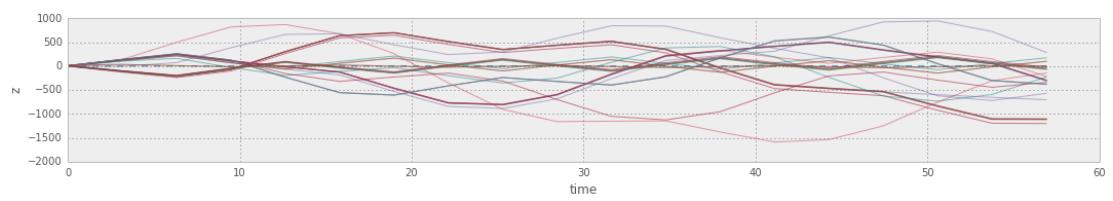
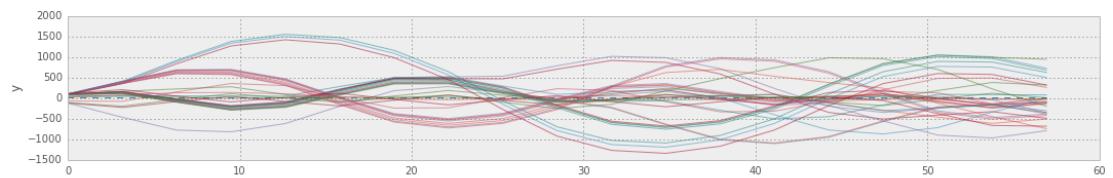
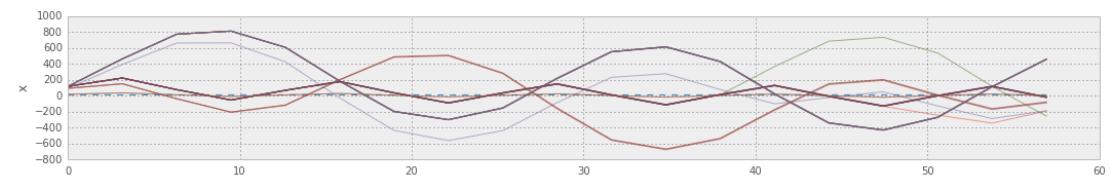
$dt = 0.316227766017$



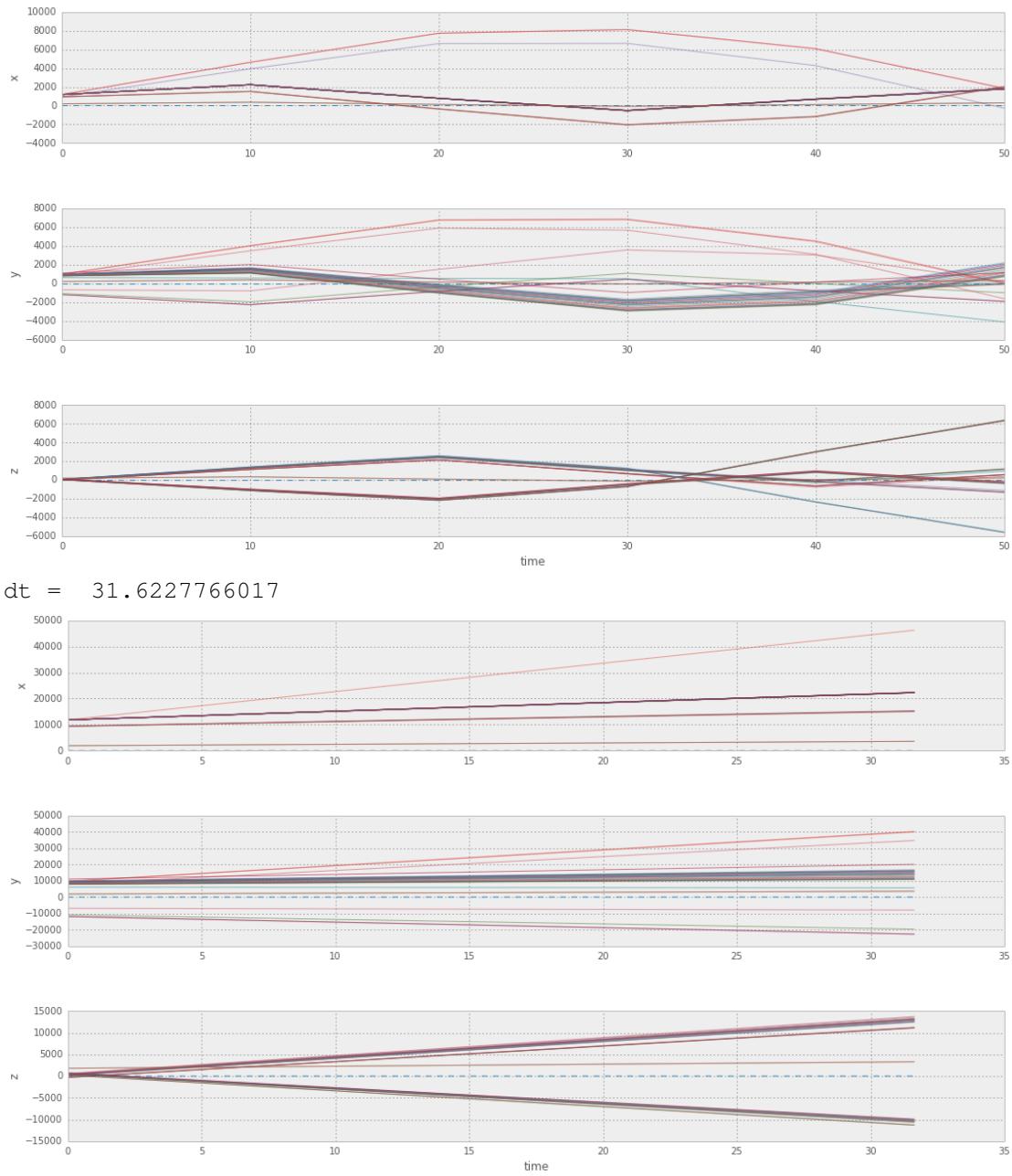
$dt = 1.0$



$dt = 3.16227766017$



$dt = 10.0$



## 2 players instables

On définit un player seul qui se déplace devant le vidéoprojecteur, à une distance

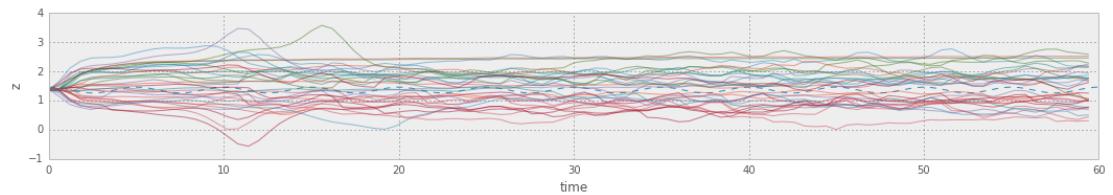
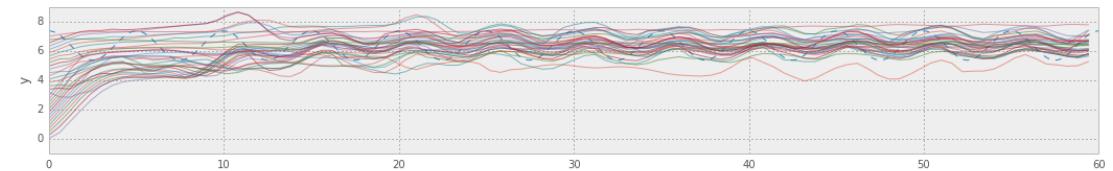
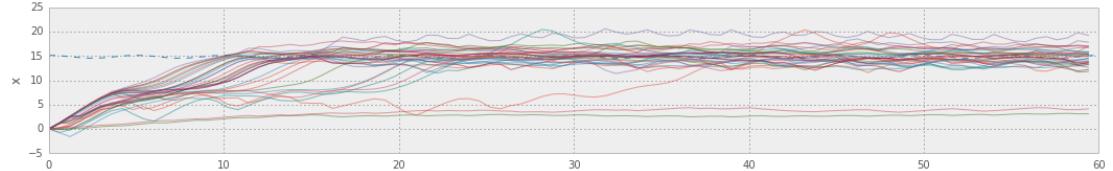
```
print VPs[0]
```

```
In [16]: {'cz': 1.36, 'cy': 3.5, 'cx': 0, 'pc_min': 0.001, 'address': '10.42.0.54', 'y': 6.37, 'x': 10.84, 'pc_max': 1000000.0, 'z': 1.36, 'foc': 21.802535306060136}
```

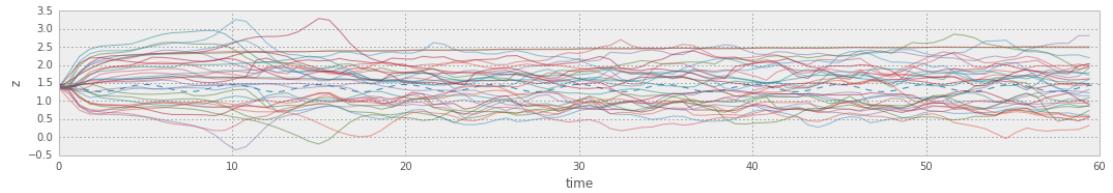
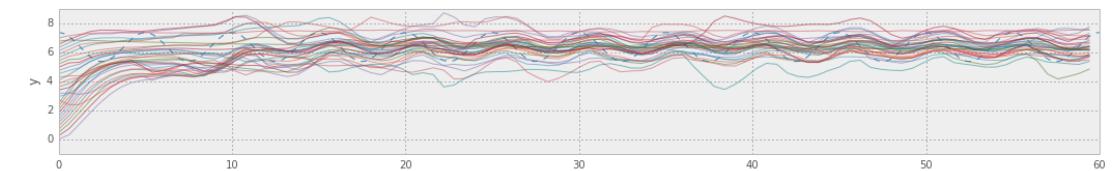
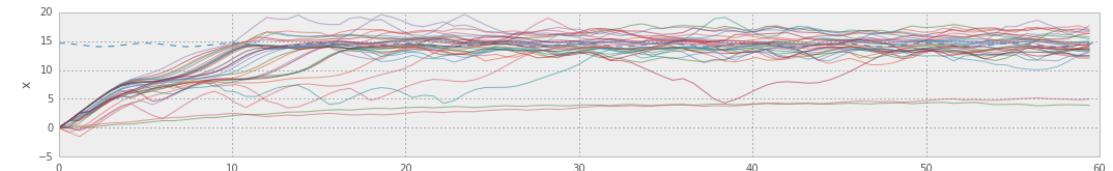
```
In [17]:  

    for distance in np.linspace(4., 0., 8, endpoint=False):
        print 'Distance du player au VP = ', distance
        players = [{'center': [VPs[0]['x'] + distance, VPs[0]['y'], VPs[0]['z']], 'amp': [
            pos, particles = simul(p, players)
            plt.show()
```

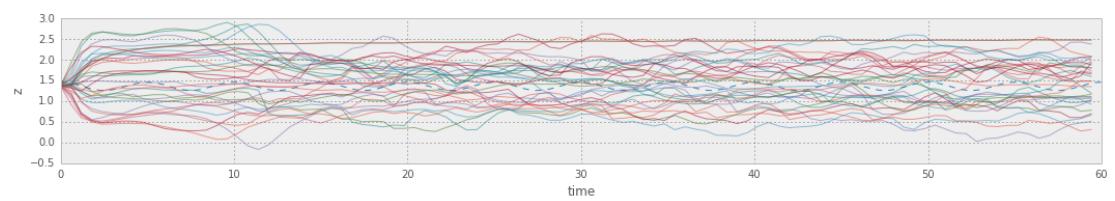
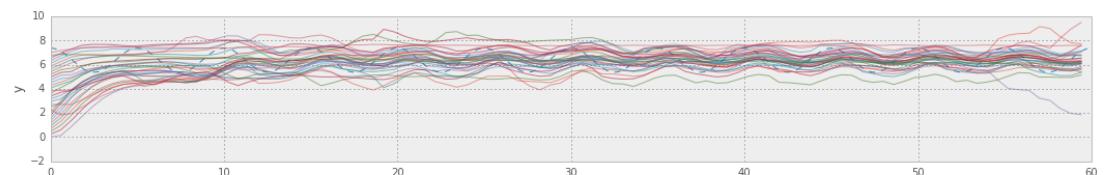
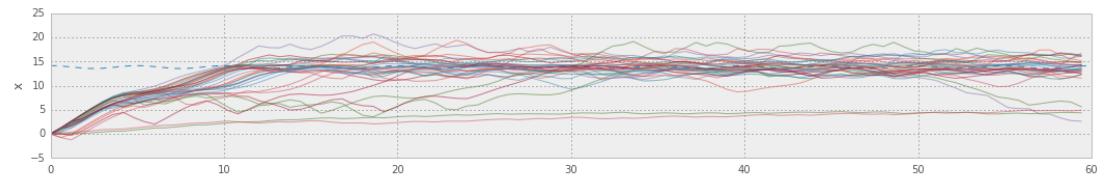
Distance du player au VP = 4.0



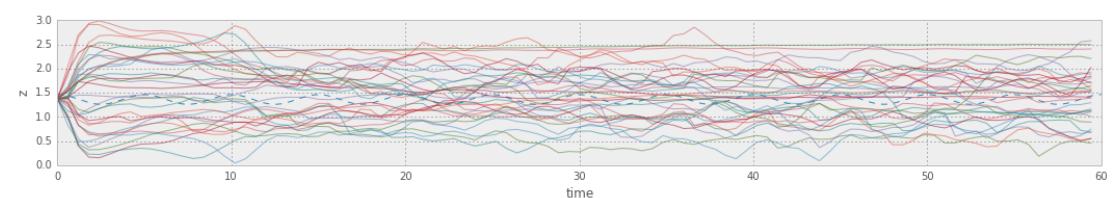
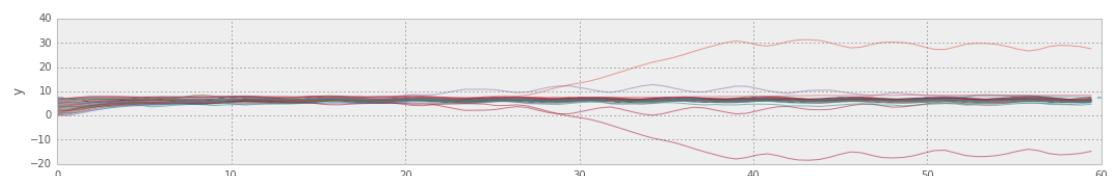
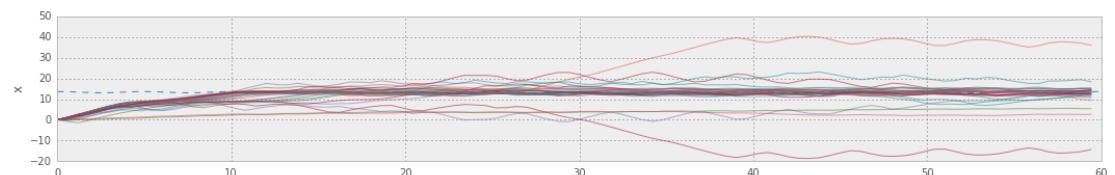
Distance du player au VP = 3.5



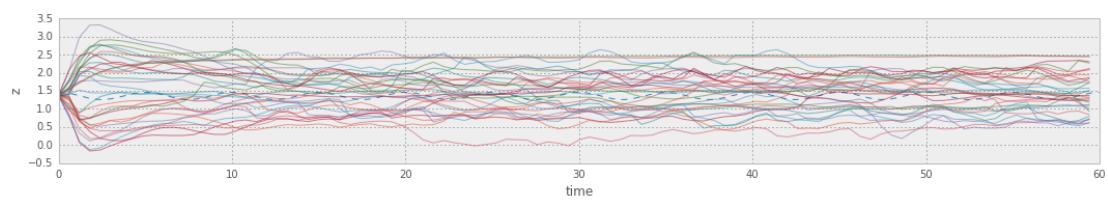
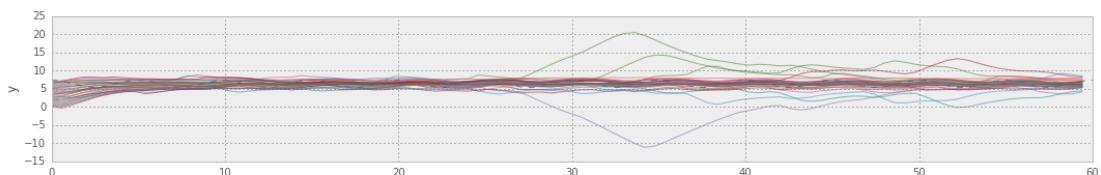
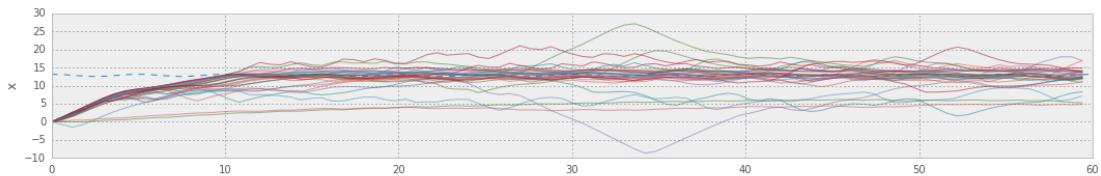
Distance du player au VP = 3.0



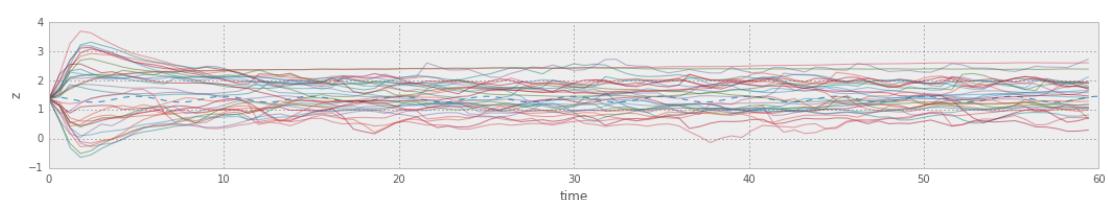
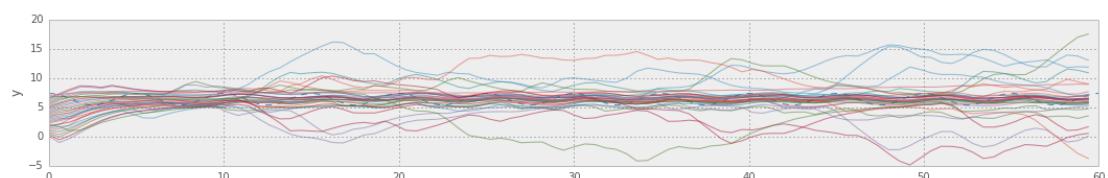
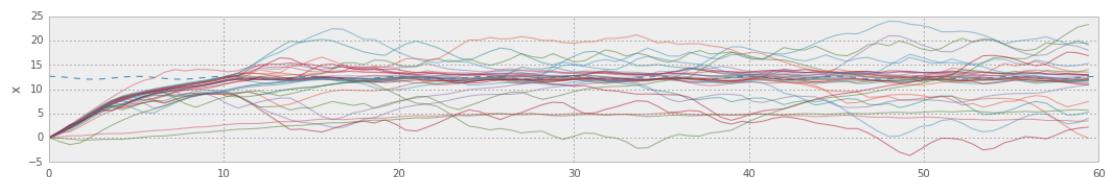
Distance du player au VP = 2.5



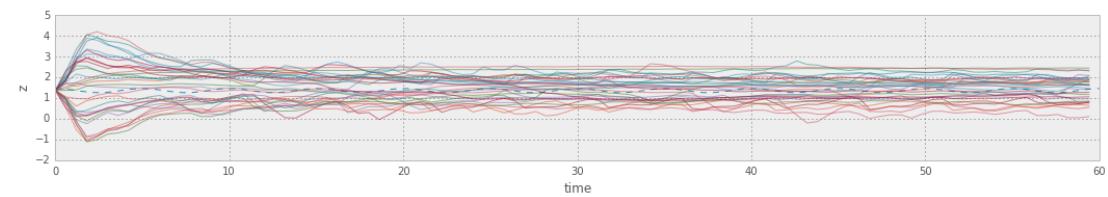
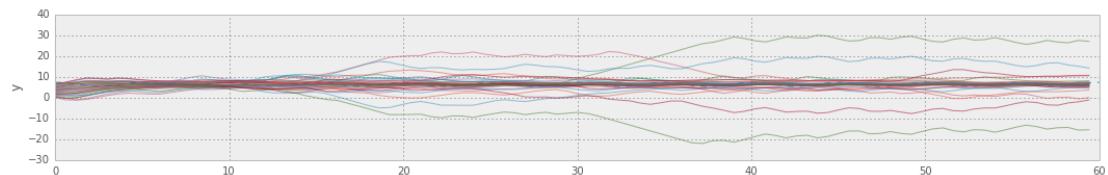
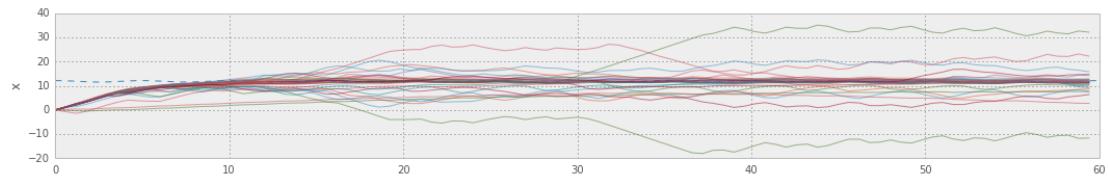
Distance du player au VP = 2.0



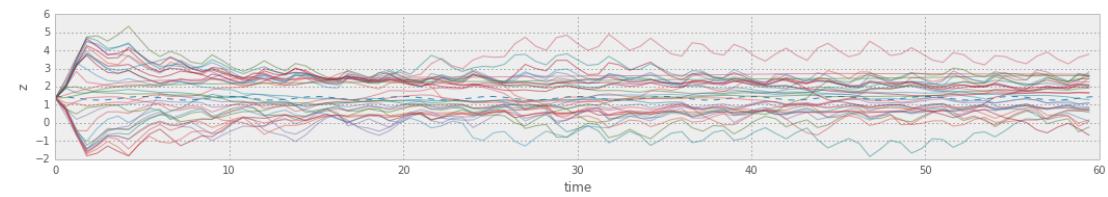
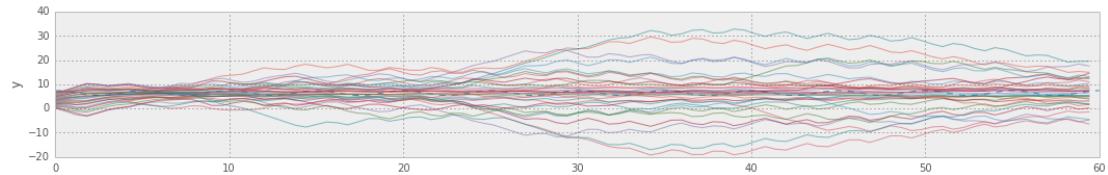
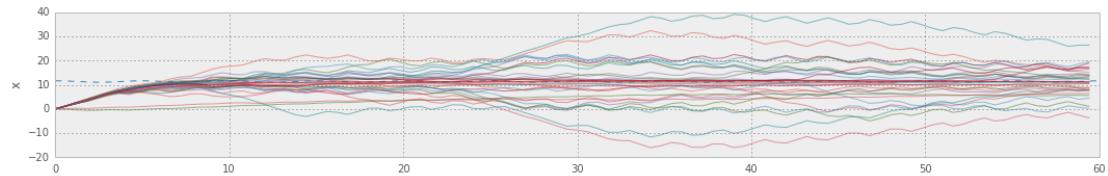
Distance du player au VP = 1.5



Distance du player au VP = 1.0



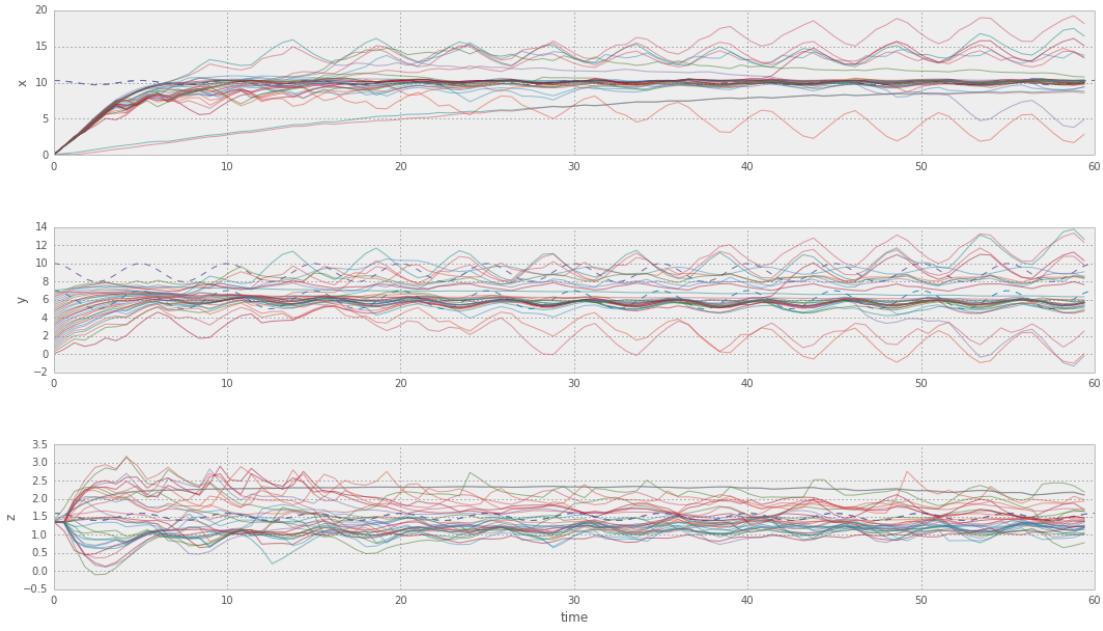
Distance du player au VP = 0.5



(note: il faut bien regarder l'amplitude des variations sur les axes)

### 3 multi players

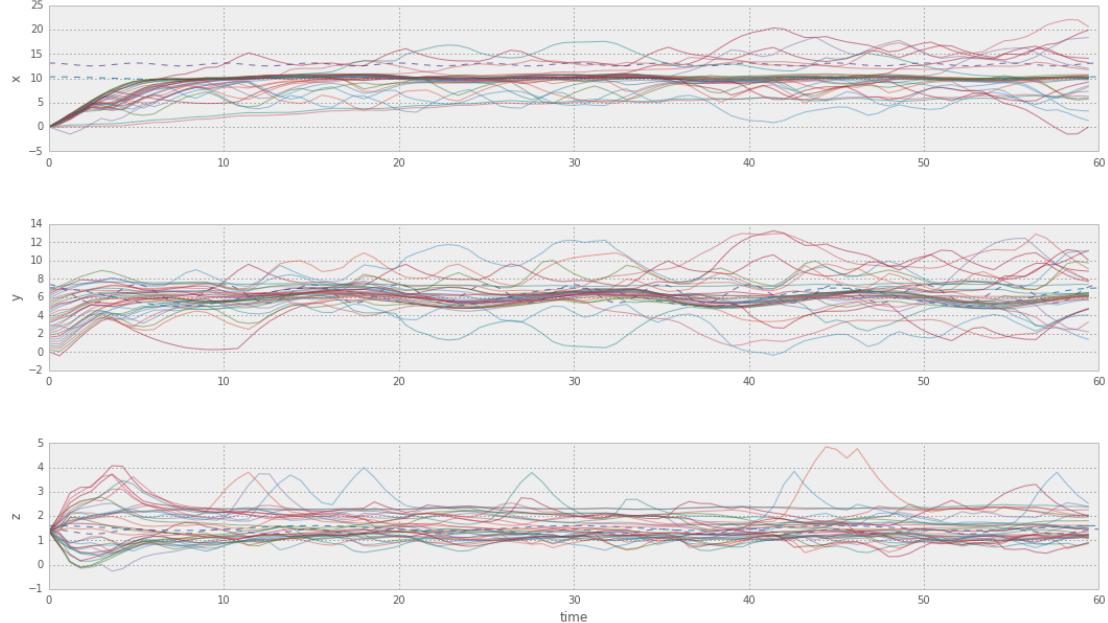
```
In [18]: players = [{"center": [10., 6, 1.5], 'amp': [.3,1.,.1], 'T': 5.}, {"center": [10., 9, 1.5], 'amp': [.3,1.,.1], 'T': 5.}]
pos, particles = simul(p, players)
```



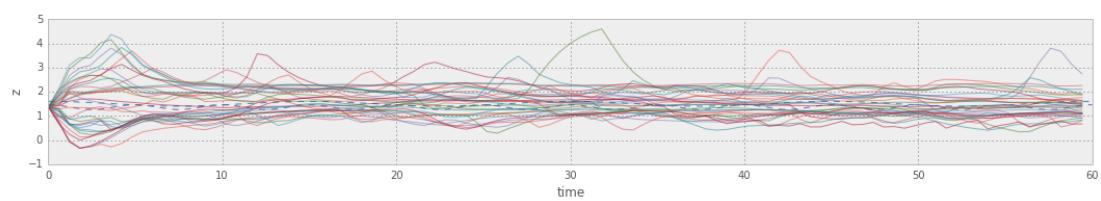
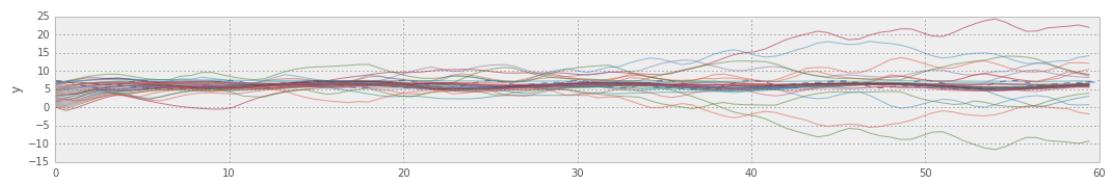
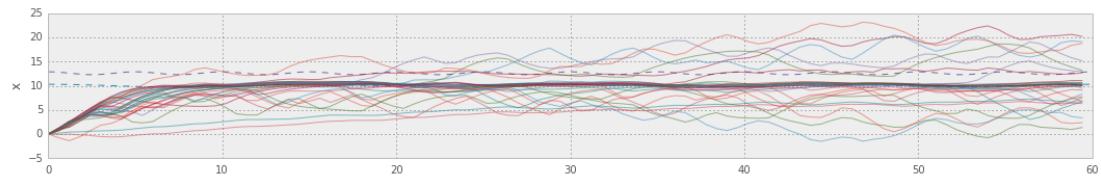
#### étude de la stabilité avec une autre personne

```
In [19]:  
    for distance in np.linspace(2., 0., 8, endpoint=False):  
        players = [ {'center': [10., 6, 1.5], 'amp': [.3,1.,.1] , 'T': 15.} ]  
        print 'Distance du player au VP = ', distance  
        players.append({ 'center': [VPs[0]['x'] + distance, VPs[0]['y'], VPs[0]['z']], 'amp':  
        pos, particles = simul(p, players)  
        plt.show()
```

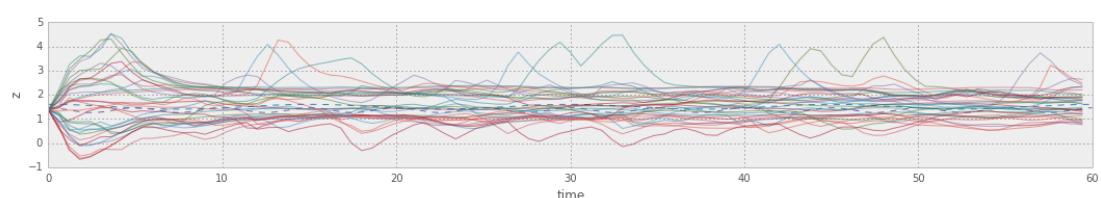
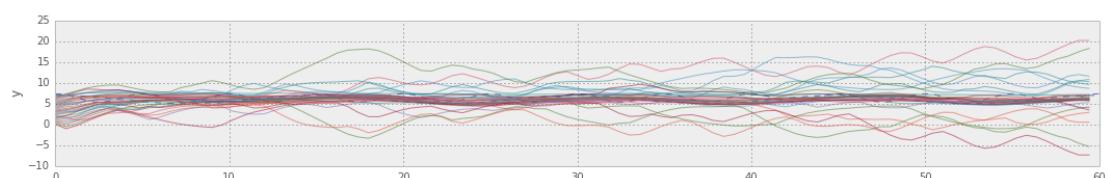
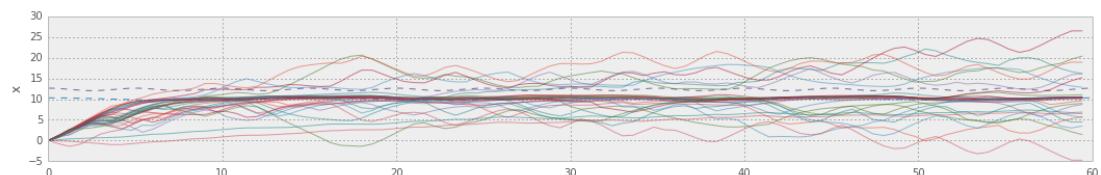
Distance du player au VP = 2.0



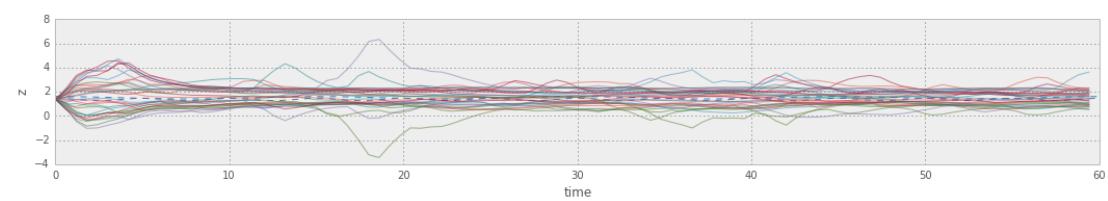
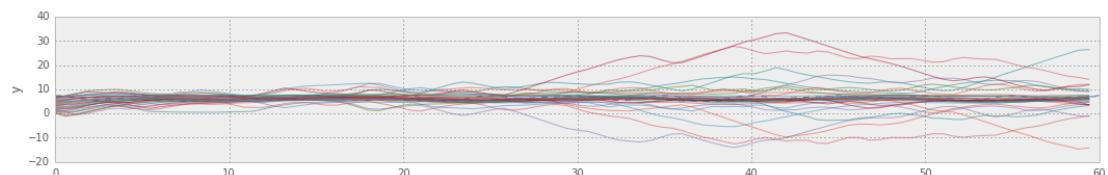
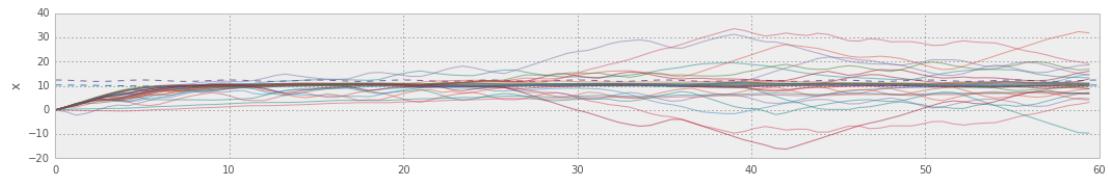
Distance du player au VP = 1.75



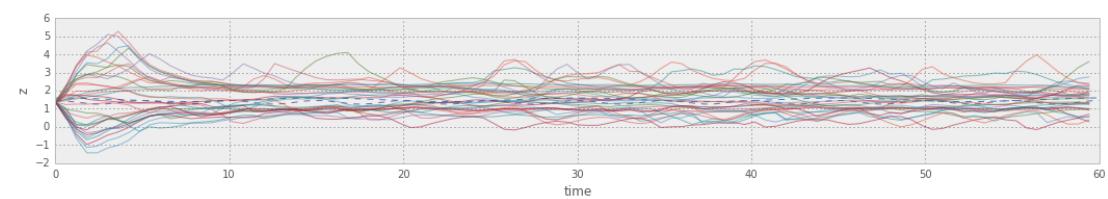
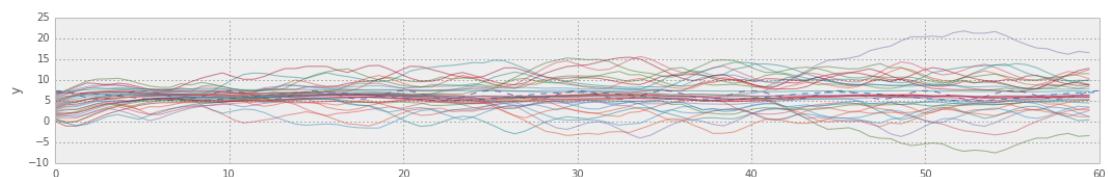
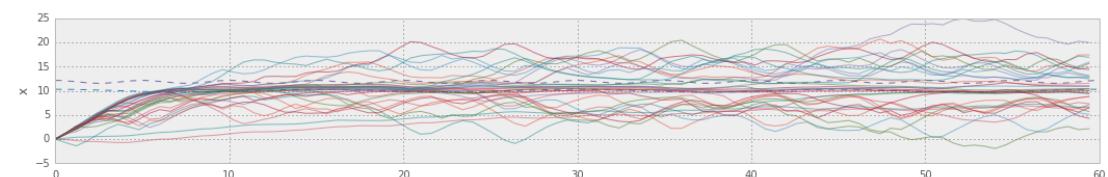
Distance du player au VP = 1.5



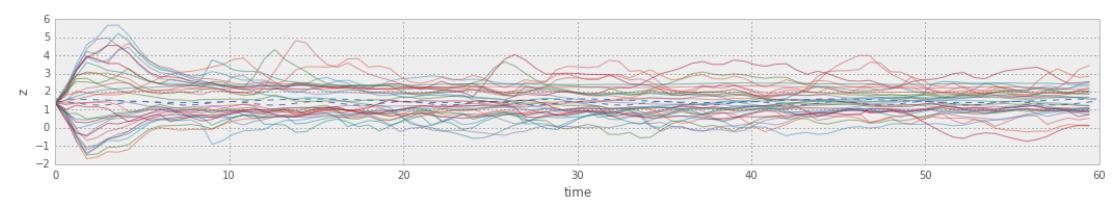
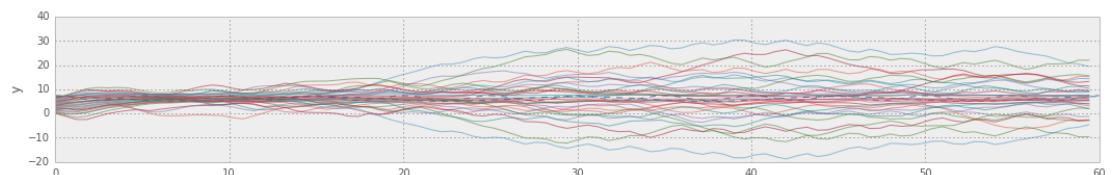
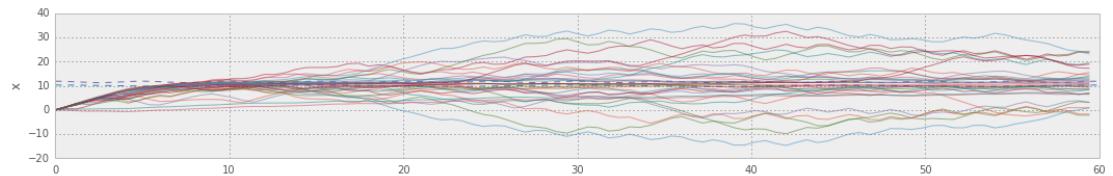
Distance du player au VP = 1.25



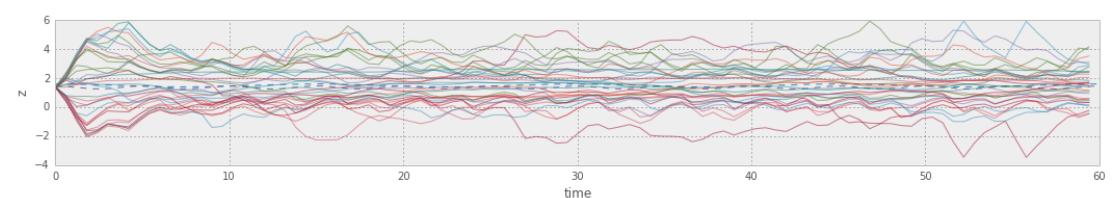
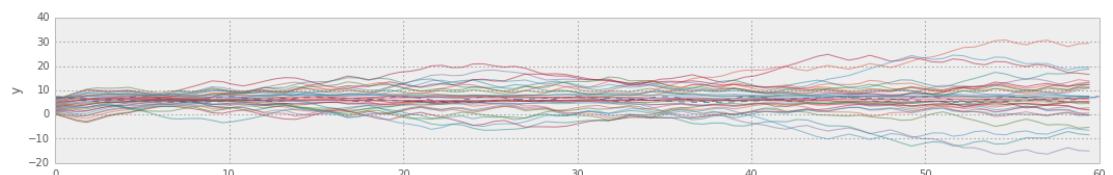
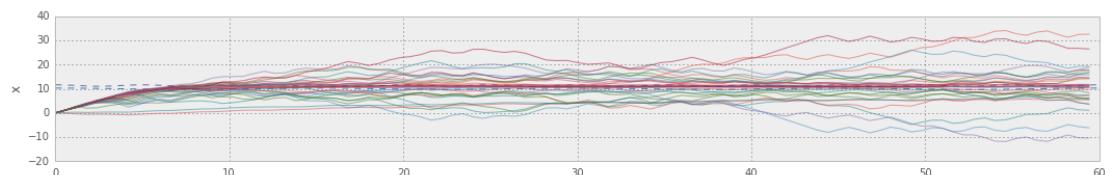
Distance du player au VP = 1.0



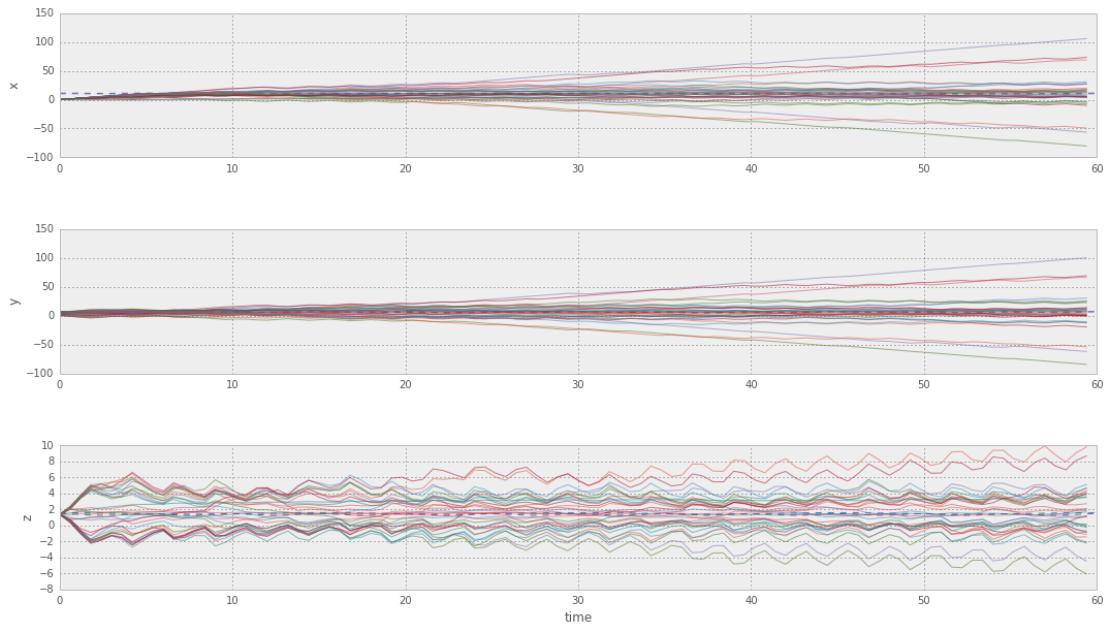
Distance du player au VP = 0.75



Distance du player au VP = 0.5



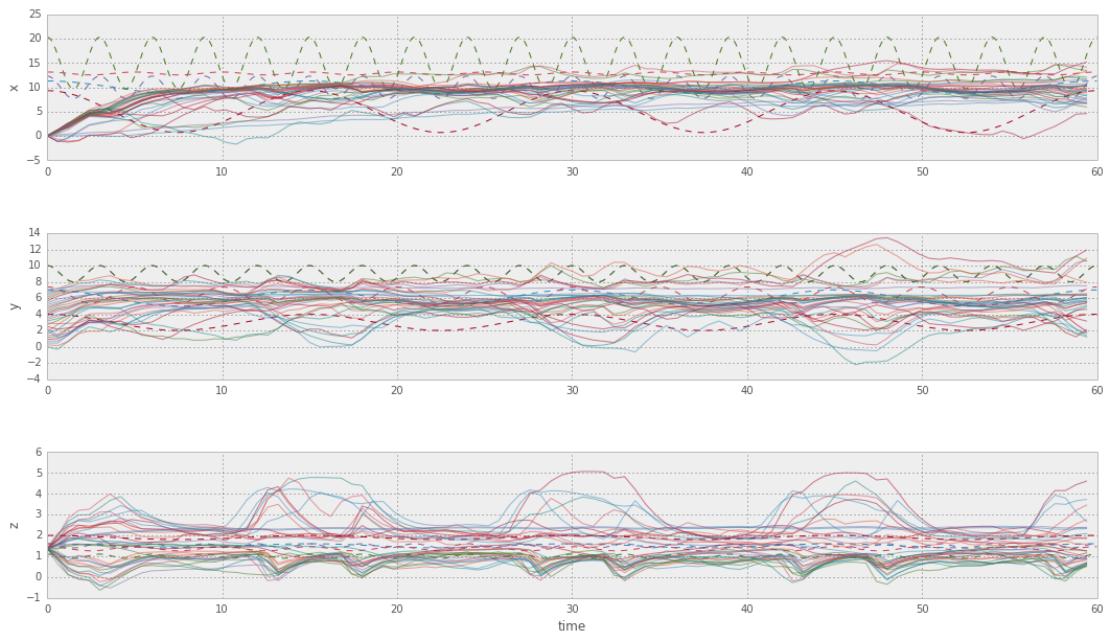
Distance du player au VP = 0.25



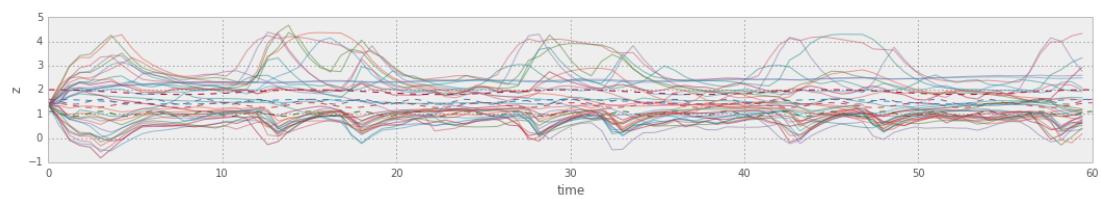
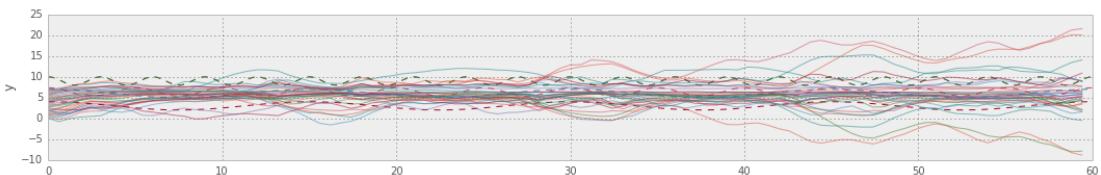
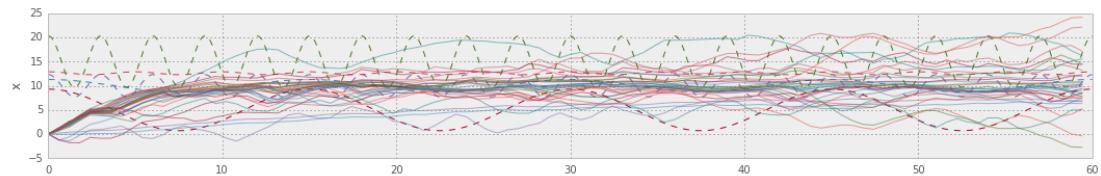
#### étude de la stabilité avec quatre autres personnes

```
In [20]: for distance in np.linspace(2., 0., 8, endpoint=False):
    players = [{'center': [10., 6, 1.5], 'amp': [1.3,1.,.1], 'T': 15.},
               {'center': [10., 9, 1.5], 'amp': [2.3,1.,.1], 'T': 3.},
               {'center': [5., 3, 1.9], 'amp': [4.3,1.,.1], 'T': 15.},
               {'center': [15., 9, 1.], 'amp': [5.3,1.,.1], 'T': 3.}]
    print 'Distance du player au VP = ', distance
    players.append({'center': [VPs[0]['x'] + distance, VPs[0]['y'], VPs[0]['z']], 'amp':
pos, particles = simul(p, players)
plt.show()
```

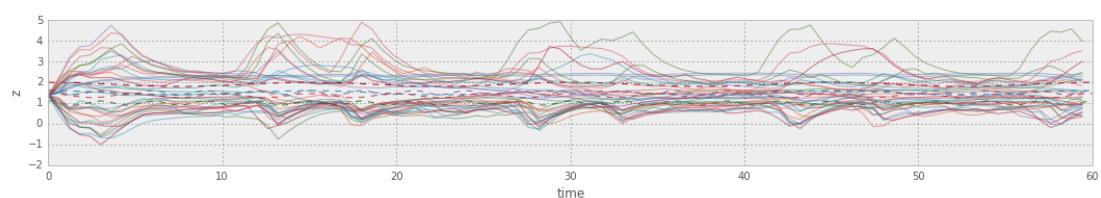
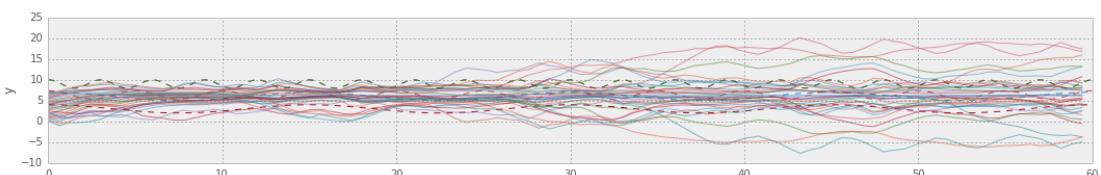
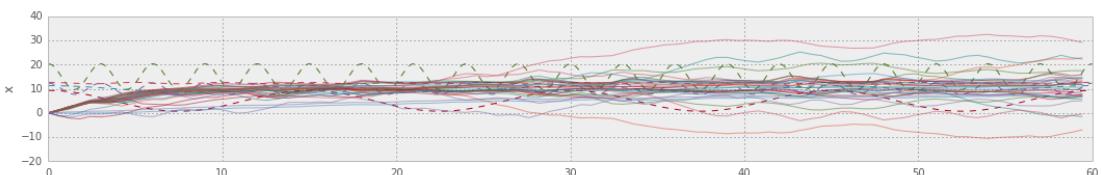
Distance du player au VP = 2.0



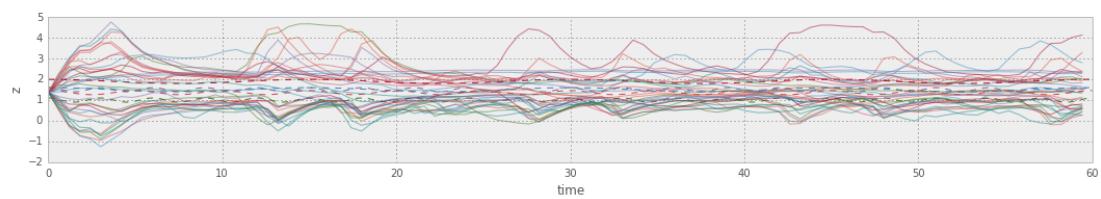
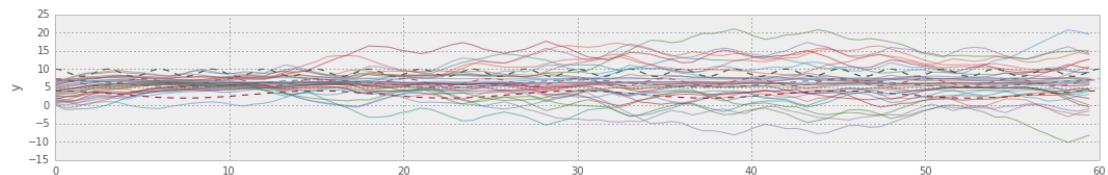
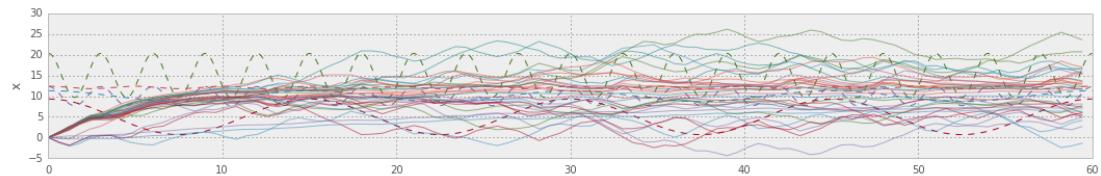
Distance du player au VP = 1.75



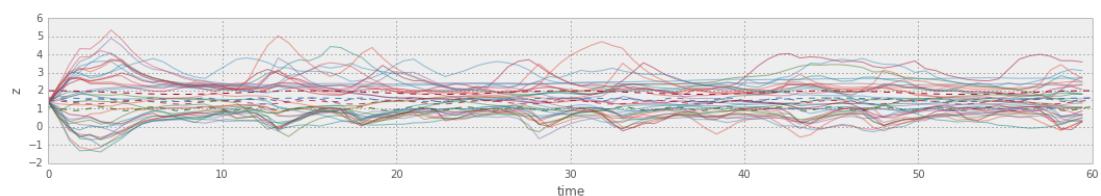
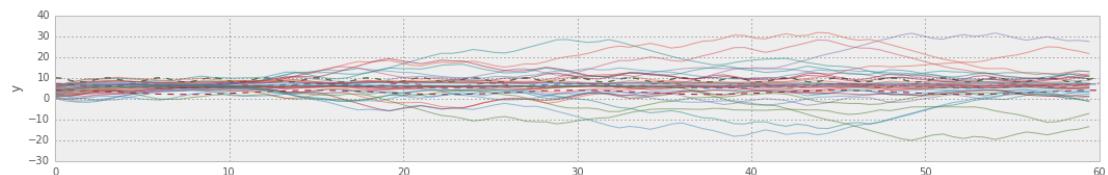
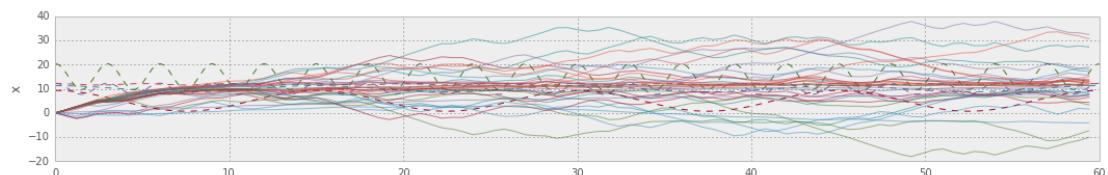
Distance du player au VP = 1.5



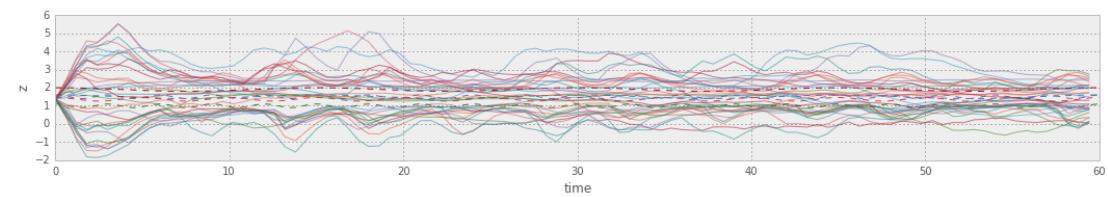
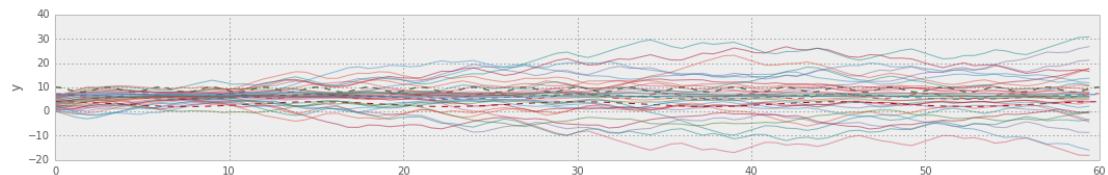
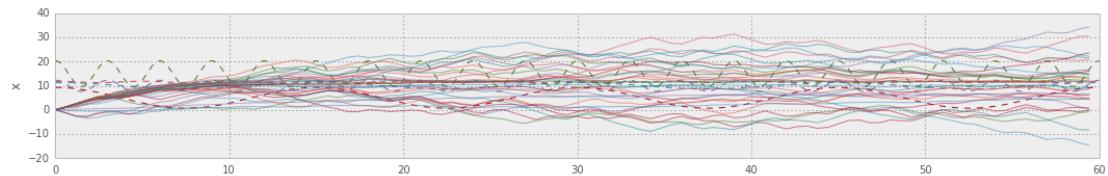
Distance du player au VP = 1.25



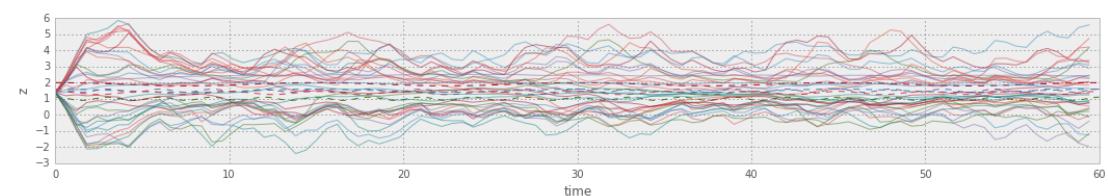
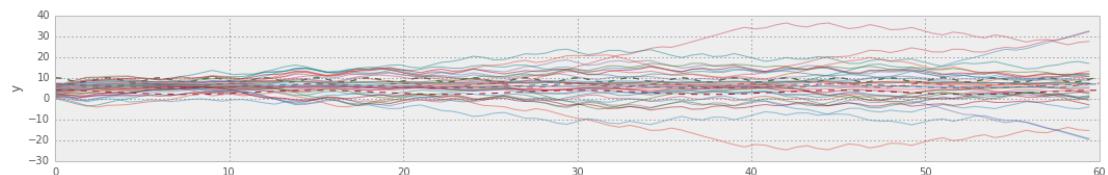
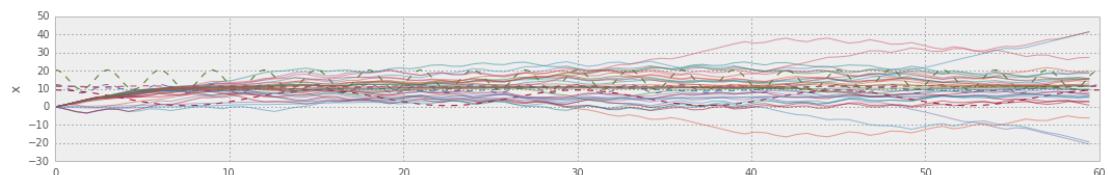
Distance du player au VP = 1.0



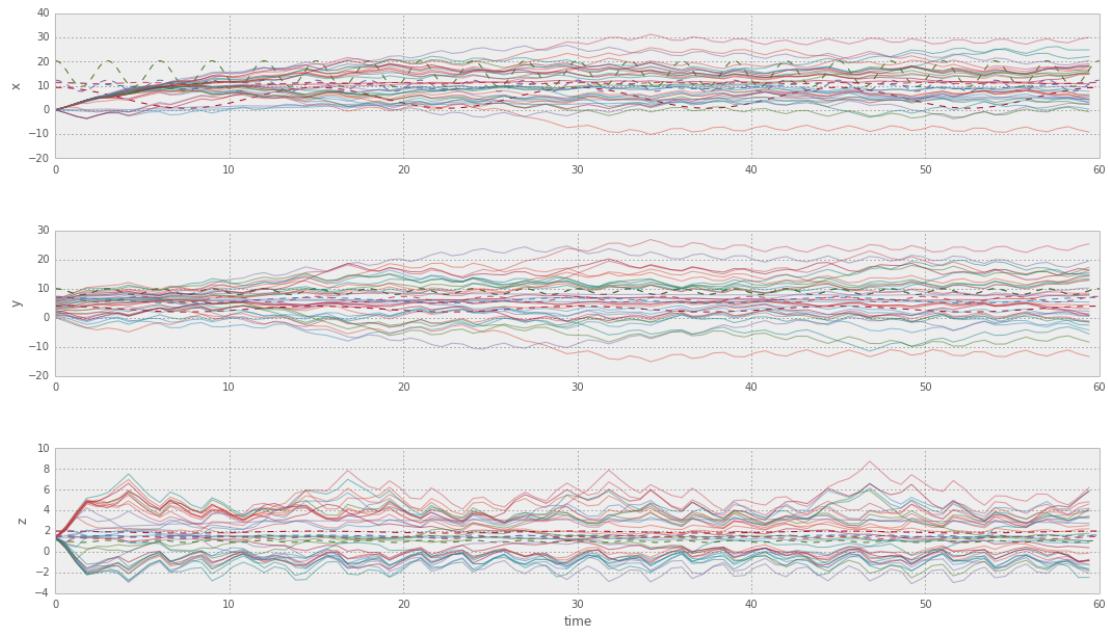
Distance du player au VP = 0.75



Distance du player au VP = 0.5



Distance du player au VP = 0.25



In []: