

Example 2

April 5, 2019

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In [1]: import sys

        sys.path.insert(0, "..\\..\\src")
        sys.path.insert(0, "..\\..\\src\\env")
        sys.path.insert(0, "..\\..\\src\\walker")
        sys.path.insert(0, "..\\..\\src\\model")
        sys.path.insert(0, "..\\..\\src\\model\\markov\\")

In [2]: from model.markov.markov_chain_model import MarkovChainModel
        from model.markov.master_equation_integrator import MasterEquationIntegrator

In [3]: import numpy as np
        import matplotlib.pyplot as plt

In [4]: population = 100 * np.array([10, 0, 5, 0, 0, 0])

        t_1, t_2 = 0, 1
        dt = 1e-4
        time = np.arange(t_1, t_2 + dt, dt)

        model = MarkovChainModel(node_population = population, dt = dt)

        integrator = MasterEquationIntegrator()

        transition_matrix = [[0, 3, 0, 0, 0, 0],\
                             [0, 0, 1, 0, 0, 0],\
                             [0, 0, 0, 5, 0, 0],\
                             [0, 0, 0, 0, 0.01, 0],\
                             [0, 0, 0, 0, 0, 1e-3],\
                             [1e-6, 0, 0, 0, 0, 0]]

        transition_matrix = np.array(transition_matrix, dtype = np.float) * 5

        model.add_transition_probabilities_to_nodes_(transition_matrix)

        model.run(time = t_2)

        ts, arr = model.get_population_time_series(nodes = [0, 1, 2, 3, 4, 5])
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    pred_t, pred_y = integrator(transition_matrix, population, (t_1, t_2), t_eval = time)

'=====]          Progress: 100%'

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In [5]: fig, ax = plt.subplots()

        fig.set_figwidth(15)

        i = 0

        for ar in arr:
            ax.scatter(ts, ar, s = 2, label = 'Model ' + str(i))
            i += 1

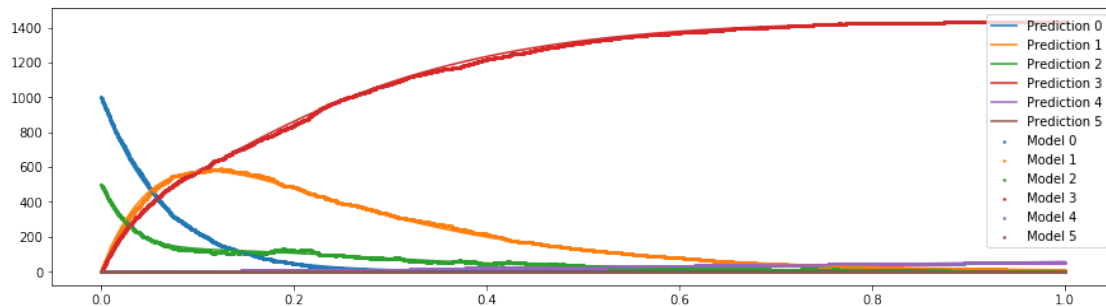
        i = 0

        for y in pred_y:
            ax.plot(pred_t, y, label = 'Prediction ' + str(i))
            i += 1

        ax.legend()
        plt.show()

        fig.savefig("../data/out/model/markov/linear_chain_example.png")

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In [6]: model.write_population_data(path = "../data/out/model/markov/linear_chain_example.t

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In [ ]:

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