9 Gauss の消去法による連立一次方程式の解法（つづき）2023年度　総合教育科目演習 I（金 3 限）

入学年度		学部	学 科		組		番 号			検	フリガナ	
											氏 名	

1 次の連立 1 次方程式を Gauss の消去法のアルゴリズムにしたがって解け.

$$\begin{cases} -2y-3z-6w=1 \\ x-3y+z-2w=1 \\ -2x+7y+8w=-2 \\ -3y-4z-9w=-1 \end{cases}$$

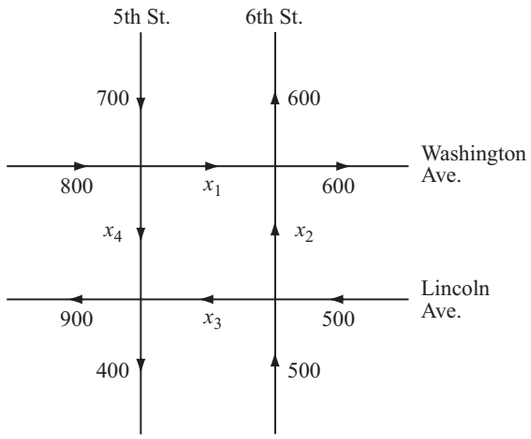
2 次の連立 1 次方程式が解を持つように定数 a を決め，そのときの解をすべて求めよ.

$$\begin{cases} x+3y+z-2w=-2 \\ 2x+7y-z-6w=-3 \\ x+2y+7z+3w=-6 \\ 4x+9y+7z-8w=a \end{cases}$$

2023 年 9 月 29 日

【裏に続く】

3 *Traffic flow.* The rush-hour traffic flow for a network of four one-way streets in a city is shown in the figure. The numbers next to each street indicate the number of vehicles per hour that enter and leave the network on that street. The variable x_1, x_2, x_3, and x_4 represent the flow of traffic between the four intersections in the network.



a) For a smooth traffic flow, the number of vehicles entering each intersection should always equal the number leaving. For example, since 1500 vehicles enter the intersection of 5th Street and Washington Avenue each hour and $x_1 + x_4$ vehicles leave this intersection, we see that $x_1 + x_4 = 1500$. Find the equations determined by the traffic flow at each of the other three intersections.

b) Find the solution to the system in a).

c) What is the maximum number of vehicles that can travel from Washington Avenue to Lincoln Avenue on 5th Street? What is the minimum number?

d) If traffic lights are adjusted so that 1000 vehicles per hour travel from Washington Avenue to Lincoln Avenue on 5th Stree, determine the flow around the rest of the network.