Restatement of the problem and Criteria for Optimal plaza Configuration

我们被要求寻找一个设计plaza的sulotion，通过determine它的size，shape，以及merging pattern.使各方面因素（include throughput cost security）达到最优，

**Restatement of the problem**

In this paper, we are required to explore better solutions to design a departure zone of a toll plaza (if they exist). We may reach the better solutions with optimal throughput, cost or safety by determining its size, shape and merging pattern. All the model establishing processes are based on the fixed number of tollbooths (B) and the lanes after merging (L). From our perspective, connecting all the considerations with cost directly or indirectly and make cost our main objective function is an explicit and effective plan.

**Our work**

From our perspective, connecting all the considerations with cost directly or indirectly and make cost our major objective function is an explicit and effective plan. Thus, all our models are established out of this thought.

In detail, we can determine an average waiting time by calculating the throughput of the toll plaza. In this way, we may then quantify the average waiting time as money consumption with an introduction of a uniform “waiting time cost”. Our goal is to look for the minimum cost (including time and construction cost) in the case of satisfying basic scrutiny conditions. In other words, the overall cost is our objective function and security factors are constraints towards the objective function. We can get better solutions by minimizing the overall cost.

通过计算plaza的capacity，得到他的总waiting time（单位hour\*person），利用统一的等待时间成本（$/hour/person）可将等待时间量化为金钱消耗，我们的目标就是设计在满足基本安全条件的情况下，寻求最小的时间成本和建造成本。也就是说，时间和建造成本是我们的目标函数，安全因素是期中的约束条件（这个怎么翻译可以去搜一下线性规划）。