Weekly Report X

第 X 次汇报

XXXX Courese / Experiment

Report (X)

姓名 : Your Name

学院（系）: 机械与动力工程学院

班级 : Your Class

教师 : Your Teacher

完成时间 : Date

目录

1 Introduction

This is the weekly report of the Xth week, in this week, I have finished the following tasks:

1.1 This is a subsection

1.1.1 This is a subsubsection

2 代码环境

代码环境 (lstlisting):

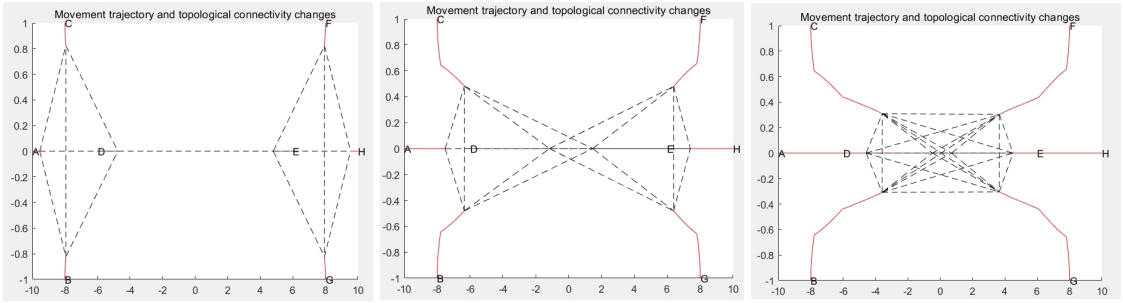
MATLAB Code 1: connection_plot function

```
    function connection_plot(agents)
    persistent lines  % persistent, 用于函数调用时的变量保存

    if isempty(lines)
        lines = [];
    end
    % delete Iter(i-1)'s lines
    for i = 1:length(lines)
        delete(lines(i));
    end
    lines = [];
    for i = 1:length(agents)
        for j = i+1:length(agents)  % only connect once
            if agents(i).isconnect(agents(j))
                h = plot([agents(i).state(1), agents(j).state(1)], ...
                         [agents(i).state(2), agents(j).state(2)], '--k'
                            );  % 使用虚线（'--k'表示黑色虚线）
                % Store the current connection line handle into the
                    lines array
                lines = [lines, h];
            end
        end
    end
    drawnow
end
```

3 图片环境

图片并排：



Topological situation 1 Topological situation 2 Topological situation 3

图 1: Different types of topological situations

链接插入：https://gitee.com/Racheus/me4409/tree/connection/

4 数学公式

数学公式 (行间、行内):

$$D(\mathcal{G})^T = \begin{bmatrix} 1 & -1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & -1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & -1 \end{bmatrix}$$

基于能量函数的方法，设计非线性连通保持控制器的过程如下：

将目标队形表述为 $\tau_i \in \boldsymbol{R}^n$,$d_{ij} = \tau_i - \tau_j$。

记位移为 $y_i = x_i(t) - \tau_i$，令 $l_{ij}(t) = x_i(t) - x_j(t)$，则有 $\lambda_{ij}(t) = l_{ij}(t) - d_{ij}$。

假设机器人的通讯半径为 Δ, 定义能量函数

$$V_{ij}(\delta - \|d_{ij}\|, y) = \begin{cases} \frac{\|\lambda_{ij}\|^2}{\Delta - \|d_{ij}\| - \|\lambda_{ij}\|}, & \text{if} \quad \{v_i, v_j\} \in E_d \\ 0, \quad \text{otherwise} \end{cases}$$

求导，可以设计控制器:

$$u_i = \dot{x_i}(t) = -\sum_{j \in N_{\mathcal{G}} d(i)} \frac{2(\Delta - \|d_{ij}\| - \|\lambda_{ij}\|)}{(\Delta - \|d_{ij}\| - \|\lambda_{ij}\|)^2}(x_i(t) - x_j(t) - d_{ij})$$

5 表格环境

表格环境 table

		48×48×48	100×100×100	216×216×216
Solve	**1**	0.998	10.419	134.256
Time	**2**	0.554	6.269	90.683
(s)	**4**	0.326	4.220	75.198
内存占用 (MB)		200.3	1012.55	10944.42