

# D3 的比例尺与交互

李春芳

20190520

# D3 与 Echart 的差别

- ▶ Echart 加载数据绘图
  - ✓ 严谨的可视化理论
  - ✓ 便捷的数据驱动方法
  - ✓ 丰富友好的文档案例
- ▶ D3 只是一个框架

# Bring data to life with SVG, Canvas and HTML

## D3 版本的差异 V3/V4/V5

原理相同，报错查看 API

### ► Layout

► `var pie = d3.layout.pie(); 3.0`

► `var pie = d3.pie(); 4.0`

### ► SVG

► `var arc = d3.svg.arc()`

`.innerRadius(innerRadius)`

`.outerRadius(outerRadius); 3.0`

► `const arc = d3.arc()`

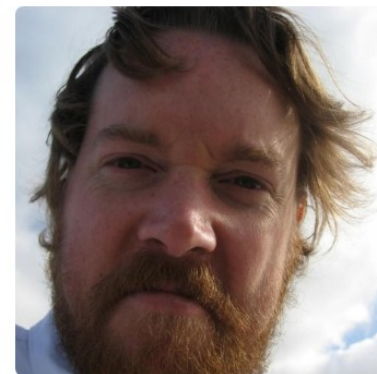
`.innerRadius(innerRadius)`

`.outerRadius(outerRadius); 4.0`



# D3 一组链接

- ▶ 官网 : <https://d3js.org/>
- ▶ GitHub : <https://github.com/d3>
- ▶ 斯坦福大学 : <http://vis.stanford.edu/papers/d3>
- ▶ 作者本人 : <https://github.com/mbostock>
- ▶ 实现 D3 词云图 : <https://bost.ocks.org/mike/>
- ▶ 中传如艺 : <http://cuc.yingshinet.com/>



Mike Bostock

# 力导向比较 V3&V4

- ▶ `var force = d3.layout.force()`
- ▶ `.charge(-120)`
- ▶ `.linkDistance(200)`
- ▶ `.size([width, height]);`

```
d3.json("a.json", function(error, graph) {  
  console.log(graph);  
  force.nodes(graph.nodes)  
    .links(graph.links)  
    .start();  
  
  var node = svg.selectAll(".node")  
    .data(graph.nodes)  
    .enter().append("circle")  
    .attr("class", "node")  
    .attr("r", 16)  
    .style("fill", function(d) { return color(d.group); })  
    .call(force.drag);  
  var link = svg.selectAll(".link")  
    .data(graph.links)  
    .enter().append("line")  
    .attr("class", "link")  
    .style("stroke-width", function(d) { return Math.sqrt(d.value); });  
  force.on("tick", function() {  
    link.attr("x1", function(d) { return d.source.x; })  
      .attr("y1", function(d) { return d.source.y; })  
      .attr("x2", function(d) { return d.target.x; })  
      .attr("y2", function(d) { return d.target.y; });  
  
    node.attr("cx", function(d) { return d.x; })  
      .attr("cy", function(d) { return d.y; });  
  });  
});
```

# D3.V4

```
▶ var force = d3.forceSimulation(graph.nodes)
▶
    .force("link",d3.forceLink(graph.links).distance(300))
▶
    .force("charge",d3.forceManyBody())
▶
    .force("center",d3.forceCenter(width/2,height/2));
var color = d3.scaleOrdinal(d3.schemeCategory10);
```



```
var force = d3.forceSimulation(graph.nodes)
    .force("link",d3.forceLink(graph.links).distance(300))
    .force("charge",d3.forceManyBody())
    .force("center",d3.forceCenter(width/2,height/2));

force.nodes(graph.nodes);
force.force("link")
    .links(graph.links);

var node = svg.selectAll(".node")
    .data(graph.nodes)
    .enter().append("circle")
    .attr("class", "node")
    .attr("r", 16)
    .style("fill", function(d) { return color(d.index); })
    .call(d3.drag().on("start", dragstarted)//d3.drag() 创建一个拖曳行为
    .on("drag", dragged)
    .on("end", dragended));
var link = svg.selectAll(".link")
    .data(graph.links)
    .enter().append("line")
    .attr("class", "link")
    .style("stroke-width", function(d) { return Math.sqrt(d.value); });

function dragstarted(d) {
    if (!d3.event.active) simulation.alphaTarget(0.3).restart();//设置目标α
    d.fx = d.x;
    d.fy = d.y;
}
```

# 比例尺：线性



The screenshot shows a web browser window at jsbin.com. The editor has tabs for HTML, CSS, JavaScript, Console, and Output. The HTML tab is active, showing the following code:

```
<html>
  <head>
    <title>线性比例尺</title>
  </head>
  <body>
    <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
    <script>
      var x = d3.scaleLinear()
        .domain([10, 130])
        .range([0, 960]);
      console.log(x(10));
      console.log(x(100));
      console.log(x(130));
    </script>
  </body>
</html>
```

The Console tab is also active, showing the output of the JavaScript code:

```
0
720
960
> |
```



# ScaleLine()

[Exporting/importing gist](#)[Vanity URLs](#)[How to disable JS Bin keyboard shortcuts](#)[Gists: how to export to a gist](#)

[New bin](#)☐ Textarea editor mode[Upgrade to pro now](#)

File ▾Add libraryShare

HTMLCSSJavaScriptConsoleOutput

```
var w=window.innerWidth
|| document.documentElement.clientWidth
|| document.body.clientWidth;

var h=window.innerHeight
|| document.documentElement.clientHeight
|| document.body.clientHeight;
w=w*0.98;
h=h*0.95;
var color=d3.scaleOrdinal(d3.schemeCategory10);

var svg = d3.select("body").append("svg")
    .attr("width", w)
    .attr("height", h);
var x=d3.scaleLinear()
    .domain([10,130])
    .range([0,900]);
console.log(x(130));
svg.append("line")
    .attr("x1",10)
    .attr("y1",x(10))
    .attr("x2",130)
    .attr("y2",x(130))
    .attr("stroke","blue");
</script>
```

Output

# 比例尺：对数

← → ↺

jsbin.com/wohohehuro/edit?html,console

File ▾

Add library

Share

HTML

CSS

JavaScript

Console

Output

HTML ▾

```
<html>
<head>
  <title>对数比例尺</title>
</head>
<body>
  <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
  <script>
    var x = d3.scaleLog()
      .domain([1,10000])
      .range([0,4]);
    console.log(x(10));
    console.log(x(100));
    console.log(x(1000));
    console.log(x(10000));
  </script>
</body>
</html>
```

Console

1

2

2.9999999999999996

4

>

# 比例尺：指数



The screenshot shows a web browser window at [jsbin.com/wohohehuro/edit?html,console](https://jsbin.com/wohohehuro/edit?html,console). The editor has tabs for HTML, CSS, JavaScript, Console, and Output. The HTML tab is active, showing the following code:

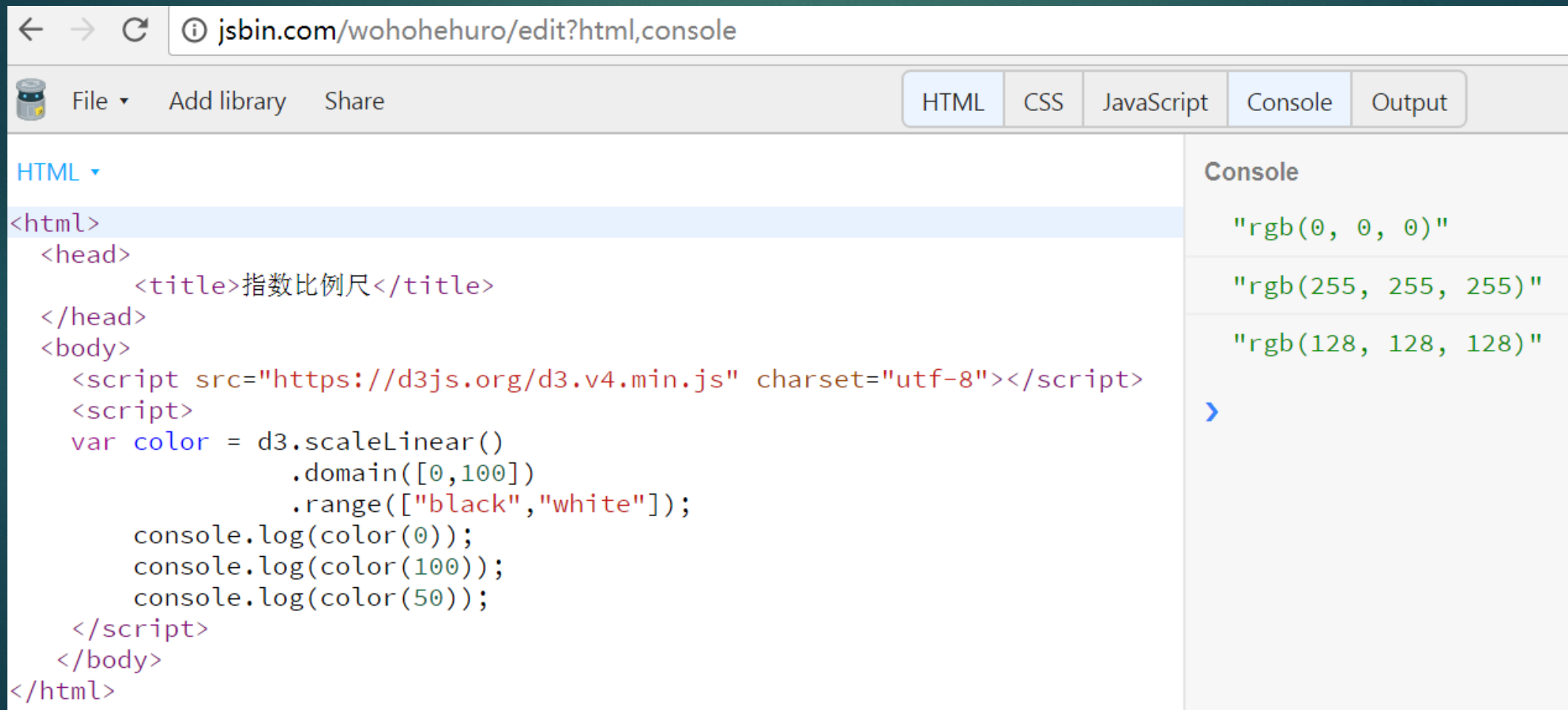
```
<html>
<head>
  <title>指数比例尺</title>
</head>
<body>
  <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
  <script>
    var x = d3.scalePow()
      .exponent(2)    //指数为2
      .domain([1,5]) //定义域
      .range([1,25]); //值域
    console.log(x(1));
    console.log(x(3));
    console.log(x(5));
  </script>
</body>
</html>
```

The Console tab on the right shows the output of the JavaScript code:

```
1
9
25
>
```



# 比例尺：结果可以是色彩



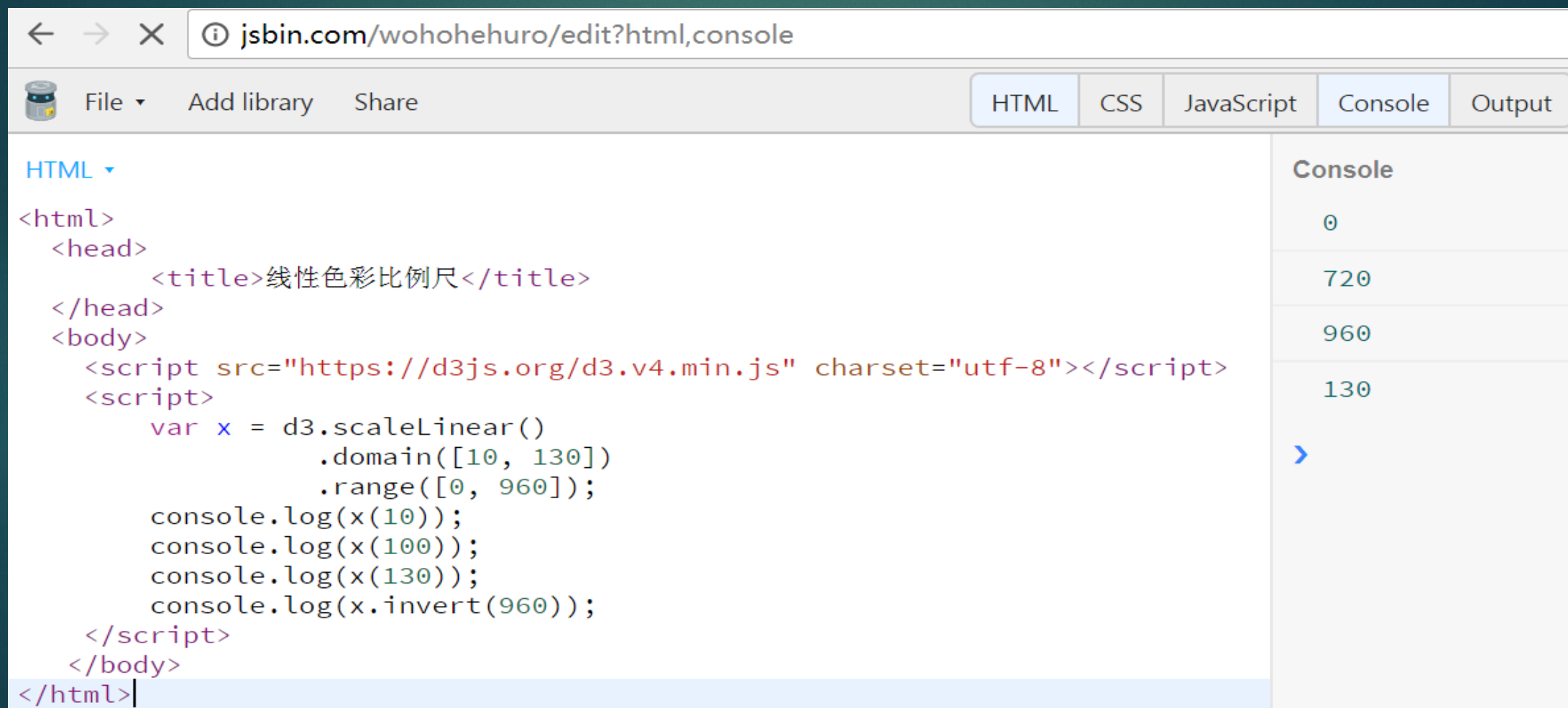
The screenshot shows a web browser window at `jsbin.com/wohohehuro/edit?html,console`. The editor has tabs for HTML, CSS, JavaScript, Console, and Output. The HTML tab is active, showing the following code:

```
<html>
  <head>
    <title>指数比例尺</title>
  </head>
  <body>
    <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
    <script>
      var color = d3.scaleLinear()
        .domain([0,100])
        .range(["black","white"]);
      console.log(color(0));
      console.log(color(100));
      console.log(color(50));
    </script>
  </body>
</html>
```

The Console tab is also active, showing the output of the JavaScript code:

```
"rgb(0, 0, 0)"
"rgb(255, 255, 255)"
"rgb(128, 128, 128)"
>
```

# 比例尺：逆运算



The screenshot shows a web browser window at jsbin.com. The editor has tabs for HTML, CSS, JavaScript, Console, and Output. The HTML tab is active, showing the following code:

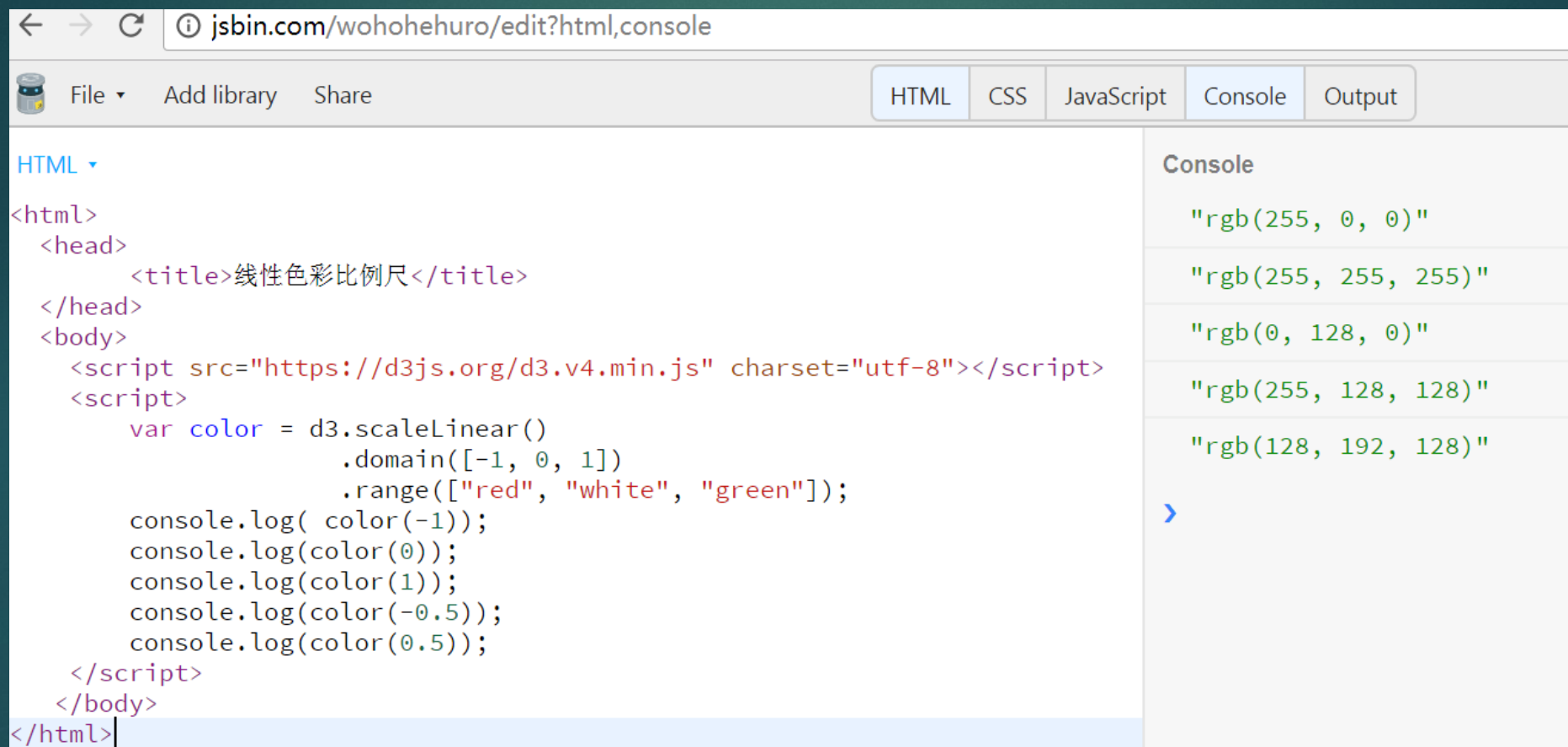
```
<html>
  <head>
    <title>线性色彩比例尺</title>
  </head>
  <body>
    <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
    <script>
      var x = d3.scaleLinear()
        .domain([10, 130])
        .range([0, 960]);
      console.log(x(10));
      console.log(x(100));
      console.log(x(130));
      console.log(x.invert(960));
    </script>
  </body>
</html>
```

The Console tab is also active, showing the output of the JavaScript code:

```
0
720
960
130
```

A blue arrow points to the right in the console, indicating the next step in the execution or a scroll action.

# 比例尺：分段函数



The screenshot shows a web browser window at jsbin.com editing an HTML file. The editor has tabs for HTML, CSS, JavaScript, Console, and Output. The HTML tab is active, showing the following code:

```
<html>
  <head>
    <title>线性色彩比例尺</title>
  </head>
  <body>
    <script src="https://d3js.org/d3.v4.min.js" charset="utf-8"></script>
    <script>
      var color = d3.scaleLinear()
        .domain([-1, 0, 1])
        .range(["red", "white", "green"]);
      console.log( color(-1));
      console.log(color(0));
      console.log(color(1));
      console.log(color(-0.5));
      console.log(color(0.5));
    </script>
  </body>
</html>
```

The Console tab is also active, displaying the output of the JavaScript code:

```
"rgb(255, 0, 0)"
"rgb(255, 255, 255)"
"rgb(0, 128, 0)"
"rgb(255, 128, 128)"
"rgb(128, 192, 128)"
>
```



# D3 配色方案



表 5-1 D3 配色方案

ID	构造函数	色彩
1	<a href="#">d3.schemeCategory10()</a>	<div><div><div>#1f77b4</div><div>#ff7f0e</div><div>#2ca02c</div><div>#d62728</div><div>#9467bd</div></div><div><div>#8c564b</div><div>#e377c2</div><div>#7f7f7f</div><div>#bcbd22</div><div>#17becf</div></div></div>
2	<a href="#">d3.schemeCategory20()</a>	<div><div><div>#1f77b4</div><div>#aec7e8</div><div>#ff7f0e</div><div>#ffbb78</div><div>#2ca02c</div><div>#98df8a</div><div>#d62728</div><div>#ff9896</div><div>#9467bd</div><div>#c5b0d5</div></div><div><div>#8c564b</div><div>#c49c94</div><div>#e377c2</div><div>#f7b6d2</div><div>#7f7f7f</div><div>#c7c7c7</div><div>#bcbd22</div><div>#dbdb8d</div><div>#17becf</div><div>#9edae5</div></div></div>