

# 积分运算

## 不定积分

```
syms x
y = x^2
```

$$y = x^2$$

```
int(y, x) % Matlab 不会自动添加 C 常数
```

```
ans =
```

$$\frac{x^3}{3}$$

```
y = 1/x;
int(y,x) % 注意 Matlab 没有为我们的 log 函数 加上绝对值，实际中是必要的
```

```
ans = log(x)
```

```
syms x a
y = 1/sqrt(x^2 - a^2)
```

```
y =
```

$$\frac{1}{\sqrt{x^2 - a^2}}$$

```
int(y, x)
```

```
ans = log(x + sqrt(x^2 - a^2))
```

## 定积分

```
syms x a b
y = exp(x)
```

$$y = e^x$$

```
int(y, x, a, b)
```

```
ans = e^b - e^a
```

```
syms x
I = (sin(x))^2/x^2
```

```
I =
```

$$\frac{\sin(x)^2}{x^2}$$

```
int(I, x, 0, inf)
```

```
ans =
```

$$\frac{\pi}{2}$$

## 数值积分

```
syms x
y = @(x) 1./exp(x).*log(x+2.*x.^2+sin(x))
```

```
y = 包含以下值的 function_handle:
    @(x)1./exp(x).*log(x+2.*x.^2+sin(x))
```

```
integral(y, 0, 4)
```

```
ans = 0.6014
```

```
% 画出函数图像
xx = 0:1e-1:10;
yy = 1./exp(xx).*log(xx+2.*xx.^2+sin(xx));
plot(xx, yy, '-');
% 数据提示
ax = gca;
chart = ax.Children(1);
datatip(chart,1.1,0.494);
```

