# Lecture6_CN

# 第六讲：非齐次方程与常数变易法

## 知识总结

| 概念 | 关键公式 / 方法 |
| --- | --- |
| **通解结构** | $y = y_h + Y_p = c_1 y_1 + c_2 y_2 + Y_p$ |
| **待定系数法** | 根据 $g(t)$ 的形式猜测 $Y_p$，如有重复则调整 |
| **常数变易法** | $Y_p = u_1 y_1 + u_2 y_2$，其中 $u_1' = \frac{-y_2 g}{W}$，$u_2' = \frac{y_1 g}{W}$ |
| **朗斯基行列式** | $W[y_1, y_2](t) = y_1 y_2' - y_2 y_1'$ |

## 1. 非齐次方程的解结构

**Theorem (Thm 3.5.2)**

*The general solution of the nonhomogeneous equation* $y'' + p(t)y' + q(t)y = g(t)$ *can be written in the form*

$$y(t) = c_1 y_1(t) + c_2 y_2(t) + Y_p(t)$$

*where* $y_1$ *and* $y_2$ *form a fundamental set of solutions of the corresponding homogeneous equation,* $c_1$ *and* $c_2$ *are arbitrary constants, and* $Y_p$ *is any solution of the nonhomogeneous equation.*

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