

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	$y = y_h + Y_p = c_1y_1 + c_2y_2 + Y_p$
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	$Y_p = u_1y_1 + u_2y_2$ ，其中 $u'_1 = \frac{-y_2g}{W}$ ， $u'_2 = \frac{y_1g}{W}$
朗斯基行列式	$W[y_1, y_2](t) = y_1y'_2 - y_2y'_1$

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

$$y(t) = c_1y_1(t) + c_2y_2(t) + Y_p(t)$$

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.