

## Übungen zu Analysis III

### Blatt 12

**1** Prove Proposition 9.6.6. □ 2

**2** Let  $L$  a linear differential operator of order  $n$  with constant real coefficients, then the functions in  $N(L)$  defined in Theorem 9.7.6 are linearly independent. □ 4

**3** Solve the following initial value problems

$$D^3y - D^2y - 2Dy = 0; \quad y(0) = Dy(0) = 0, D^2y(0) = 1$$

$$D^2y + 4y = 0; \quad y(0) = y_0, Dy(0) = y_1$$

$$mD^2y + ky = f(t); \quad y(0) = Dy(0) = 0$$

where  $m, k$  are real constants and  $m > 0$ .

□ 4