Stellingen behorende bij het proefschrift
Factorization of Linear Differential Operators
van Mark van Hoeij

1. Let k be a field of characteristic 0. The differential operator
$$\partial^4 + \frac{6x}{x^2+1}\partial^3 + \frac{8x^2+5}{(x^2+1)^2}\partial^2 + \frac{2x}{(x^2+1)^2}\partial + \frac{1}{(x^2+1)^2}$$
is reducible in $k(x)[\partial]$ if and only if there exists an $a \in k$ for which $\sqrt{-3-a^2} \in k$. This contradicts corollary 4.2, part (2), in:
Hendriks P.A., van der Put M., *Galois action on solutions of a differential equation*, J. Symb. Comp., Vol 19, No. 6, p. 559-576, (1995).

2. Let k be a field of characteristic 0. Let $c_1, c_2, c_3, c_4 \in k$. Suppose there exist $X_1, X_2, X_3, X_4 \in k$, not all 0, such that
$$X_1^2 + X_2^2 + 3X_3^2 + 3X_4^2 = 0.$$
Then there exist $Y_1, Y_2, Y_3, Y_4 \in k$, not all 0, such that
$$Y_1^2 + Y_2^2 + 3Y_3^2 + 3Y_4^2 = c_1Y_1 + c_2Y_2 + c_3Y_3 + c_4Y_4 = 0.$$

3. For any set $S \subset \mathbb{R}^2$ with 9 elements at most 54 of the $\binom{9}{3} = 84$ triangles having vertices in S are acute. This bound is sharp. A triangle is called acute if the three vertices are not collinear and each of the three angles is strictly smaller than 90 degrees.

   For 10000 points the maximal ratio of acute triangles lies between 55.56% and 61.51%.

4. Often you are more likely to find an efficient algorithm if you are not familiar with the already existing algorithms.

5. A generalization of a mathematical theorem is not always an improvement.

6. In computer algebra it is getting common to believe that computing in $\mathbb{Q}[x]/(x^2-2)$ is different from computing in $\mathbb{Q}(\sqrt{2})$.

7. With benchmarks one can obtain more accurate comparisons of efficiency between computer algebra algorithms than with complexity analysis.

8. Helaas is $10^{(10^{100})} + 13$ (=googolplex+13) geen priemgetal. Anders had ik hier een interessantere stelling kunnen formuleren.

9. Het volgende geeft een algoritme om π te berekenen. Het aantal juiste decimalen wordt in elke lus ongeveer verdrievoudigd.
   $p := 3$
   Blijf herhalen: $p := p + \sin(p)$.

10. Zonder deadline is een artikel nooit op tijd klaar.