ERRATA FOR
A PRIMER OF ALGEBRAIC D-MODULES

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Page 10: line 3 from below: $1 \leq i, j \leq 2n$ ought to be $1 \leq i \leq j \leq 2n$.

Page 13: Exercise 1.4.9: This is *not* the ring that is required in Exercise 1.4.10. Note that the matrices in 1.4.10 have infinitely many nonzero rows, while the matrices in $M_\infty(K)$ have only a finite number of nonzero rows. The correct definition is as follows: $M_\infty(K)$ is the set of matrices all of whose rows and columns have only finitely many nonzero elements. One then has to show that this is a K-algebra.

Page 16: in lines 14 and 17 'degree $k-1$' should have been 'degree less than or equal to $k-1$'.

Page 24: Exercise 3.3.1: Instead of $aJ \in J$, it should be $aJ \subseteq J$.

Page 30: Throughout this section the algebra S is a commutative algebra.

Page 37: lines 9: the correct reference is to lemma 1.1(2).

Page 37: First paragraph after the proof of Proposition 1.2: One cannot choose any $g_1, \ldots, g_n \in K[X]$ as is suggested here. Indeed most choices of polynomials will imply that ψ is the zero map. For example, take $g_1 = x_2$ and $g_2 = \cdots = g_n = 0$. Since

$$1 = [\partial_2, \partial_1 + x_2] \in J,$$

it follows that $\psi = 0$. The most general possible choice for the g_is is given by $dg_i/dx_j = dg_j/dx_i$ whenever $i \neq j$. This holds, for example, when $g_i \in K[x_i]$; cf. §2.

Page 38: lines 10 and 3 from below: A_n ought to be R.

Page 45: line 13 from below: $\tau = \sigma_h$ ought to be $\tau = \overline{\sigma_h}$.

Page 47: Line 4: It is not true that $\mathcal{H}(\epsilon') \subseteq \mathcal{H}(\epsilon)$. What is true is that $D(\epsilon') \subseteq D(\epsilon)$, which allows one to define the required map.

Page 53: Line 18: Definition of graded ring: instead of $i \in \mathbb{N}$, it should be $i \in \mathbb{Z}$. A nonpositive grading appears in Exercise 6.3, p. 63.

Page 60: Line 7: Delete the second M in 'Let M be a left A_n-module M'.

Page 60: Line 13: 'If $a \in F_k$' ought to be 'If $a \in B_k$'.

Page 61: Line 8: $gr^\Gamma N$ ought to be $gr^{\Gamma'} N$.

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Page 64: Exercise 6.11: In this exercise the operator d has to be 'generic' in a suitable sense. Moreover the hint is useless! For more details see section 5.2 (p. 239) of:

I. N. Bernstein and V. Lunts *On non-holonomic irreducible D-modules*, Invent. Math. **94** (1988), 223–243.

Page 65: Line 23: It says: 'vector spaces over K are noetherian K-modules'; it should say: 'finite dimension vector spaces over K are noetherian K-modules'.

Page 79: Line 19: Definition of $\delta(M, V)$:

$$\delta(M, V) = \{\nu \in \mathbb{R} : \dim_K \Omega_s \leq s^\nu \text{ for } s \gg 0\}.$$

Page 84: Exercise 5.2: The Hilbert polynomial should be

$$\binom{2n+t}{2n} - \binom{2n+t-k}{2n}$$

Page 87: line 7 from above: $0 \neq I \subseteq J$ should be $0 \neq J \subseteq I$.

Page 88: Line 2 from below: r should be $m(M)$.

Page 89: Line 22: This is *not* the Artin-Schreier theorem, of course. Indeed this follows from a version of the Jordan-Hölder theorem for modules.

Page 90: Line 16: The module $A(u + av)$ should be $R(u + av)$.

Page 93: Line 21: $\leq (m + 1)$ should be $\leq (m + 1)^n$.

Page 96: Exercise 4.7: The polynomial f in the hint should really be p.

Page 111: Line 20: Delete *the projection*, as this map is not a projection.

Page 147 (Line 19) and page 148 (Line 13): instead of $\tau^2 = \tau$, it should be $\tau^2 = Id$, the identity map.

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