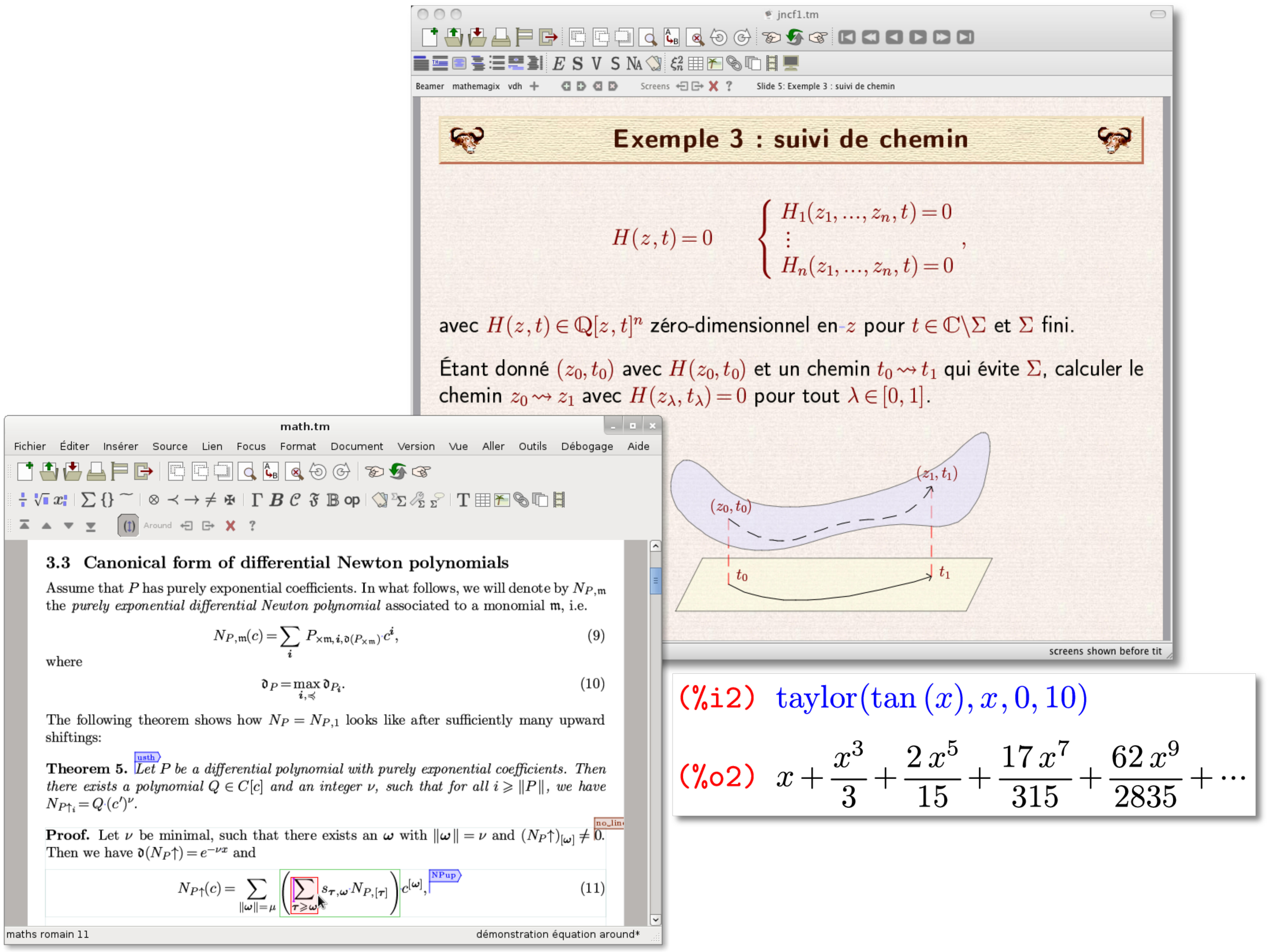
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Slide 5: Exemple 3 : suivi de chemin
Exemple 3 : suivi de chemin
$H(z,t)=0 \qquad \begin{cases} H_1(z_1,\ldots,z_n,t)=0 \\ \vdots \\ H_n(z_1,\ldots,z_n,t)=0 \end{cases},$
avec $H(z,t)\in\mathbb{Q}[z,t]^n$ zéro-dimensionnel en z pour $t\in\mathbb{C}\setminus\Sigma$ et Σ fini.
Étant donné (z_0,t_0) avec $H(z_0,t_0)$ et un chemin $t_0 \rightsquigarrow t_1$ qui évite Σ, calculer le chemin $z_0 \rightsquigarrow z_1$ avec $H(z_\lambda,t_\lambda)=0$ pour tout $\lambda\in[0,1]$.
(z_1,t_1)
(z_0,t_0)
t_0
t_1
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3.3 Canonical form of differential Newton polynomials
Assume that P has purely exponential coefficients. In what follows, we will denote by $N_{P,\mathfrak{m}}$ the *purely exponential differential Newton polynomial* associated to a monomial $\mathfrak{m}$, i.e.
$N_{P,\mathfrak{m}}(c)=\sum_i P_{\times\mathfrak{m},i,\mathfrak{d}(P_{\times\mathfrak{m}})}c^i,$ (9)
where
$\mathfrak{d}_P=\max_{i,\preccurlyeq}\mathfrak{d}_{P_i}.$ (10)
The following theorem shows how $N_P=N_{P,1}$ looks like after sufficiently many upward shiftings:
usth
Theorem 5. *Let P be a differential polynomial with purely exponential coefficients. Then there exists a polynomial $Q\in C[c]$ and an integer ν, such that for all $i\geqslant\|P\|$, we have $N_{P\uparrow_i}=Q\cdot(c')^\nu$.*
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Proof. Let ν be minimal, such that there exists an ω with $\|\omega\|=\nu$ and $(N_P\uparrow)_{[\omega]}\neq 0$. Then we have $\mathfrak{d}(N_P\uparrow)=e^{-\nu x}$ and
$N_{P\uparrow}(c)=\sum_{\|\omega\|=\mu}\left(\sum_{\tau\geqslant\omega}s_{\tau,\omega}N_{P,[\tau]}\right)c^{[\omega]},$ (11)
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(%i2) taylor(tan(x), x, 0, 10)
(%o2) $x+\frac{x^3}{3}+\frac{2x^5}{15}+\frac{17x^7}{315}+\frac{62x^9}{2835}+\cdots$