Příprava dokumentů pro formátování

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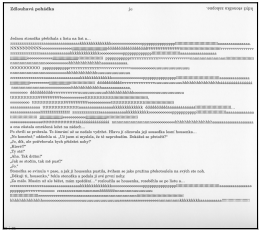
- Dokument.
- Příprava dokumentů.
- Formátování.
- Autor, sazeč, designér, redaktor.

Cíle a prostředky

Cíl: předat informaci ⟶ srozumitelnost

Prostředkem je forma:

- očekávání čtenáře, přirozenost



- nesmí rušit, ale podněcovat ke čtení

- má napomáhat stručnosti

Věda a řemeslo zabývající se formou dokumentu ⟶ typografie.

Principy dobrého dokumentu

1. informace
2. struktura
3. jednotnost
4. estetika, tradice

Struktura dokumentu

Struktura ⟶ z latinského *struere*, skládat sestavovat, budovat, pořádat

Části dokumentu

- strukturní elementy
- grafické elementy
  - viditelné
  - neviditelné

Strukturní elementy

tvoří významové a logické celky

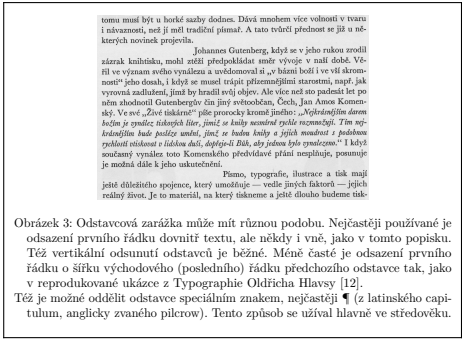
- dokument $\subset$ patitul, protititul, titulní list, vydavatelský záznam, anotace, tiráž, abstrakt, věnování, předmluva, mezititul, obsah, literatura, rejstříky, oddíly, kapitoly, podkapitoly;
- oddíl, kapitola, podkapitola, ... $\subset$ nadpis, odstavce, obrázky, tabulky, algoritmy i s jejich popisky;
- odstavec $\subset$ poznámky pod čarou, marginálie, písmena, symboly, matematické výrazy, zvýraznění, odrážky číslované i nečíslované, definice, tabulky, obrázky, akce, hypertextový link.

Grafické elementy viditelné

- kniha, brožura, . . . , článek ⟨médium, stránkové zrcadlo⟩ ⊂ stránky, sloupce;
- stránka ⟨velikost, řádkový rejstřík⟩ ⊂ sloupce, záhlaví, zápatí, stránková číslice, marginálie, plovoucí objekty včetně jejich popisků;
- sloupec ⟨pořadí, šířka⟩ ⊂ řádky, rámečky, linky;
- řádka ⟨šíře, výplň⟩ ⊂ znaky, linky, rámečky, obrázky;
- znak ⟨písmo, velikost, barva, atribut⟩;
- linka ⟨tloušťka, počátek, konec⟩;
- rámeček ⟨okraj, šířka, výška⟩;
- obrázek ⟨grafický formát, velikost⟩;
- akce a hypertextový link.

Grafické elementy neviditelné

- okraje stránky;
- mezery okolo textových elementů;
- řádkování;
- sloupce a buňky tabulky;
- interpunkční mezerování;
- mezerování matematických výrazů.

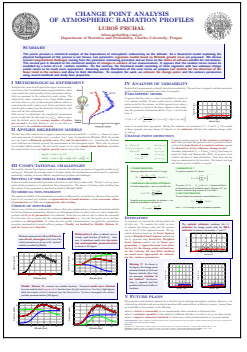


tomu musí být u horké sazby dodnes. Dává mnohem více volnosti v tvaru i návaznosti, než jí měl tradiční písmař. A tato tvůrčí přednost se jí u některých novinek projevila.

Johannes Gutenberg, když se v jeho rukou zrodil zázrak knihtisku, mohl sotěží předpokládat směr vývoje v naší době. Věřil ve význam svého vynálezu a uvědomoval si „v bázni boží i ve vší skromnosti“ jeho dosah, i když se musel trápit přízemnějšími starostmi, např. jak vyrovná zadlužení, jímž by hradil svůj objev. Ale více než sto padesát let po něm zhodnotil Gutenbergův čin jiný světoobčan, Čech, Jan Amos Komenský. Ve své „Živé tiskárně“ píše prorocky kromě jiného: „*Nejhrálnějším darem božím je vynález tiskových liter, jimiž se knihy neustále rychle rozmnožují. Tím nejkrásnějšího bude použíce umění, jímž se budou knihy a jejich moudrost z podobnou rychlostí tiskovat v lidskou duši, dopřejeli Bůh, aby jakou kdy vynalezeno.*“ I když současný vynález toto Komenského předvídavé přání nesplňuje, posunuje je možná dále k jeho uskutečnění.

Písmo, typografie, ilustrace a tisk mají ještě důležitého spojence, který umožňuje — vedle jiných faktorů — jejich reálný život. Je to materiál, na který tiskneme a ještě dlouho budeme tisk-

Obrázek 3: Odstavcová zarážka může mít různou podobu. Nejčastěji používané je odsazení prvního řádku dovnitř textu, ale někdy i vně, jako v tomto popisku. Též vertikální odsunutí odstavců je běžné. Méně časté je odsazení prvního řádku o šířku východového (posledního) řádku předchozího odstavce tak, jako v reprodukované ukázce z Typographie Oldřicha Hlavsy [12].
Též je možné oddělit odstavce speciálním znakem, nejčastěji ¶ (z latinského capitulum, anglicky zvaného pilcrow). Tento způsob se užíval hlavně ve středověku.



CHANGE POINT ANALYSIS
OF ATMOSPHERIC RADIATION PROFILES

LUBOŠ PECHAL

Jednotnost dokumentu

Jednotnost:

1. stejné elementy stejně

2. související elementy se sjednocující myšlenkou

3. rovnoměrné pokrytí strany







4. dodržení národních, oborových a lokálních konvencí

5. chronologická jednotnost

Odstrašující příklad

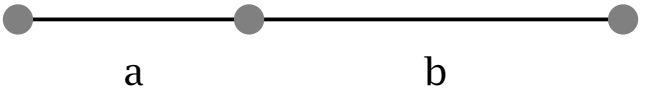
Tradice, estetika

Příklady tradice:

- směr čtení;
- číslování stránek arabsky a římsky;
- interpunkce: –, —; uvozovky: „německé“, “anglické”, « francouzské ».

Příklady estetiky:

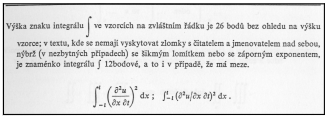
- vdovy, sirotky;
- řádkový rejstřík u více sloupců;
- proporce; zlatý řez.



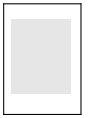
Obecné pravidlo formátování

Informace × jednotnost

Absolutní jednotnost nenese žádnou informaci!


Výška znaku integrálu $\int$ ve vzorcích na zvláštním řádku je 26 bodů bez ohledu na výšku vzorce; v textu, kde se nemají vyskytovat zlomky s čitatelem a jmenovatelem nad sebou, nýbrž (v nezbytných případech) se šikmým lomítkem nebo se záporným exponentem, je znaménko integrálu $\int$ 12bodové, a to i v případě, že má meze.

$$\int_{-1}^{1}\left(\frac{\partial^2 u}{\partial x\,\partial t}\right)^2 \mathrm{d}x\,; \quad \int_{-1}^{1}(\partial^2 u/\partial x\,\partial t)^2\,\mathrm{d}x\,.$$



Struktura × jednotnost



Jednotnost × tradice

Obecné pravidlo formátování

Povolit právě tolik vyjímek z jednotnosti,
kolik je nezbytné pro zachování informace a vyznačení zvolené struktury.
Ne více.

Požadavky na editaci dat I.

Editace obtížná:
počet, složitost a provázanost pravidel; dělba kompetencí autor–sazeč.

Z hlediska autorů

- snadnost a intuitivnost použití;
- výhradní používání strukturních elementů s jejich kontextovou nabídkou;
- zákaz či potlačení grafických elementů;
- vnucování definované struktury textu;
- odstranění rutinních a k chybám náchylných úkonů (číslování, obsah).

Požadavky na editaci dat II.

Z hlediska sazečů

- grafická obecnost;
- podpora jednotnosti;
- snadnost experimentování;
- oddělení formátování od obsahu;
- čitelnost a
- minimalizace práce.

Z hlediska správců dat

- dlouhodobá platnost dat (využívání standardů),
- multiúčelovost (zpracování variabilním softwarem, různý výstup, otevřený formát),
- validace definované struktury dat a
- platformní nezávislost.

Strukturní značkování

Formát

podporující { strukturu, jednotnost } → strukturní značkování ← { obsah, formátování } oddělující

Výhody strukturního značkování:

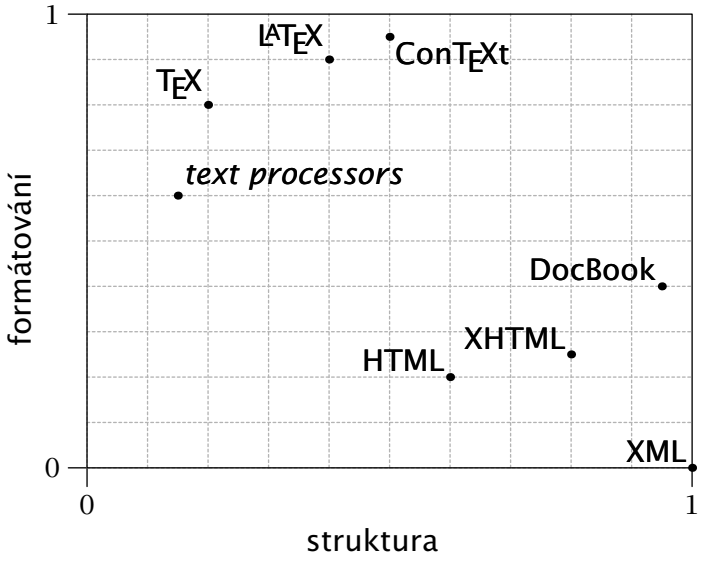
- odstínění formátování od obsahu;
- oddělení formátování od struktury;
- expertní rozdělení kompetencí;
- snadné udržování jednotnosti;
- vyšší přehlednost u větších projektů a pro více uživatelů;
- definování a verifikování struktury;
- snadná globální změna formátování;
- snažší znovuvyužití textu;
- snadné generování různých výstupů;
- snažší správa variant dokumentu.

Nevýhody strukturního značkování:

- požaduje větší disciplínu autora;
- menší flexibilitu u elementů, na které se nemyslelo při návrhu.

Způsoby značkování

Značkovací jazyky



- TeX Knuth 1982, LaTeX Lamport 1985, ConTeXt Hagen 1996
- SGML ⟶ HTML ⟶ XML (Extensible Markup Language), standard W3C, 1997
- DocBook od 1991 http://docbook.cz

Editace

Editory pro strukturní značkování:

1. textový editor
   - \+ obecnost pro textový formát,
   - − nutná znalost formátu,
2. textový editor s podporou pro strukturní formát [Emacs, Vim, jEdit, ...]
   - \+ bez omezení na možnosti formátu,
   - \+ kontextová nabídka,
   - \+ strukturní pohyb,
   - \+ syntaktické zvýraznění,
   - \+ validace,
   - − nutná znalost formátu,
   - − bez grafického formátování;
3. textový (WYSIWYG) procesor [Microsoft Word, OpenOffice.org Writer, LyX]
   - \+ snadná editace,
   - − bez přímé validace,
   - − nenabádá ke strukturnímu značkování,
   - − problematické získání strukturovaného obsahu;
4. strukturní (WYSIWYG/M) procesor [Syntext Serna, oXygen, Altova, XML-mind]
   - \+ vstup jen dovolené struktury (on-line validace),
   - \+ kontextová nabídka,
   - \+ strukturní pohyb,
   - \+ není nutná znalost formátu,
   - \+ grafické formátování,
   - − z formátu použitelné, jen co je implementováno.

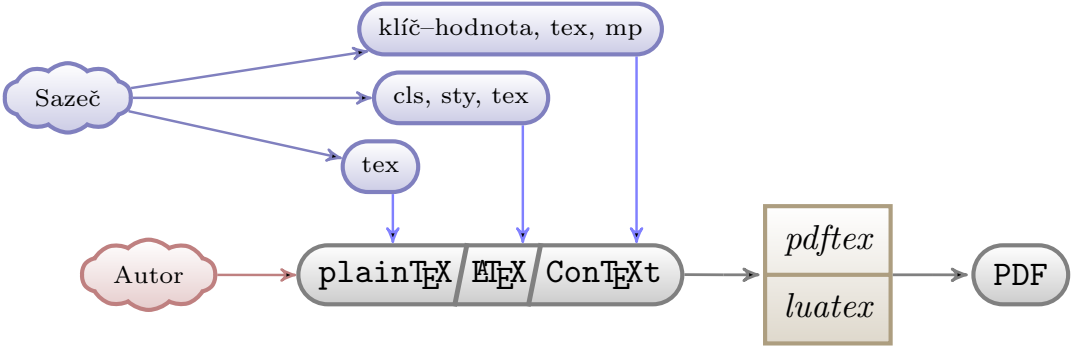
WYSIWYG Strukturní editor

- Autor edituje v grafickém režimu;
- text jen strukturně značkuje
  - vstupem z klávesnice,
  - kontextovým výběrem „intelisence“,
  - výběrem z menu, palet nebo záložek;
- grafický vzhled strukturním elementům přiřazen pomocí XML-FO nebo CSS.

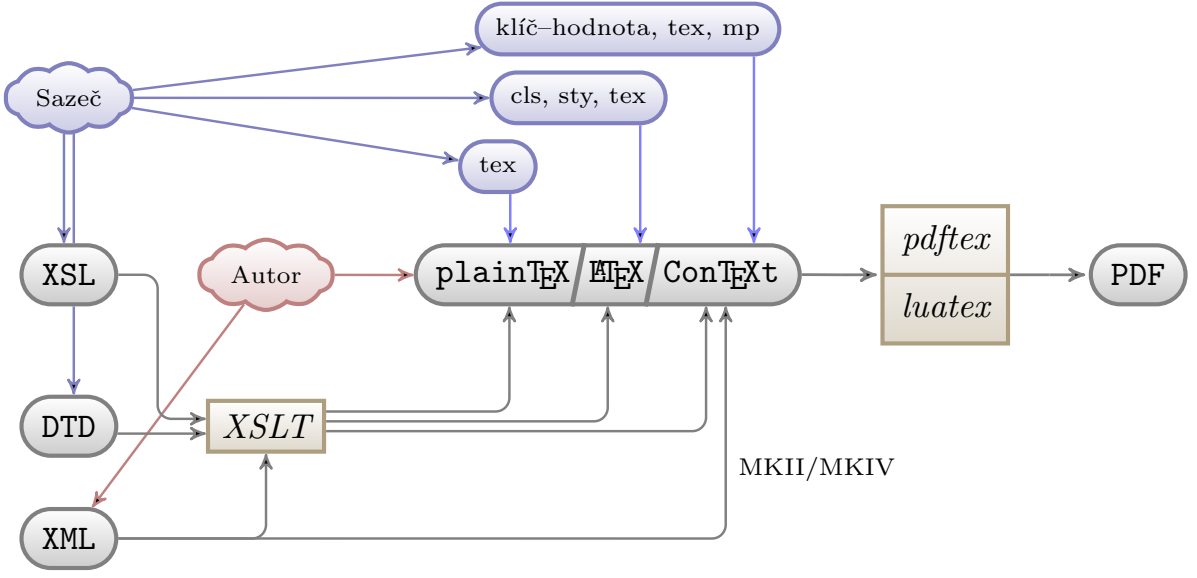
Ukázka editace ve strukturním editoru

- ⟨**oXygen/**⟩ **XML Author**
- **XMLmind**

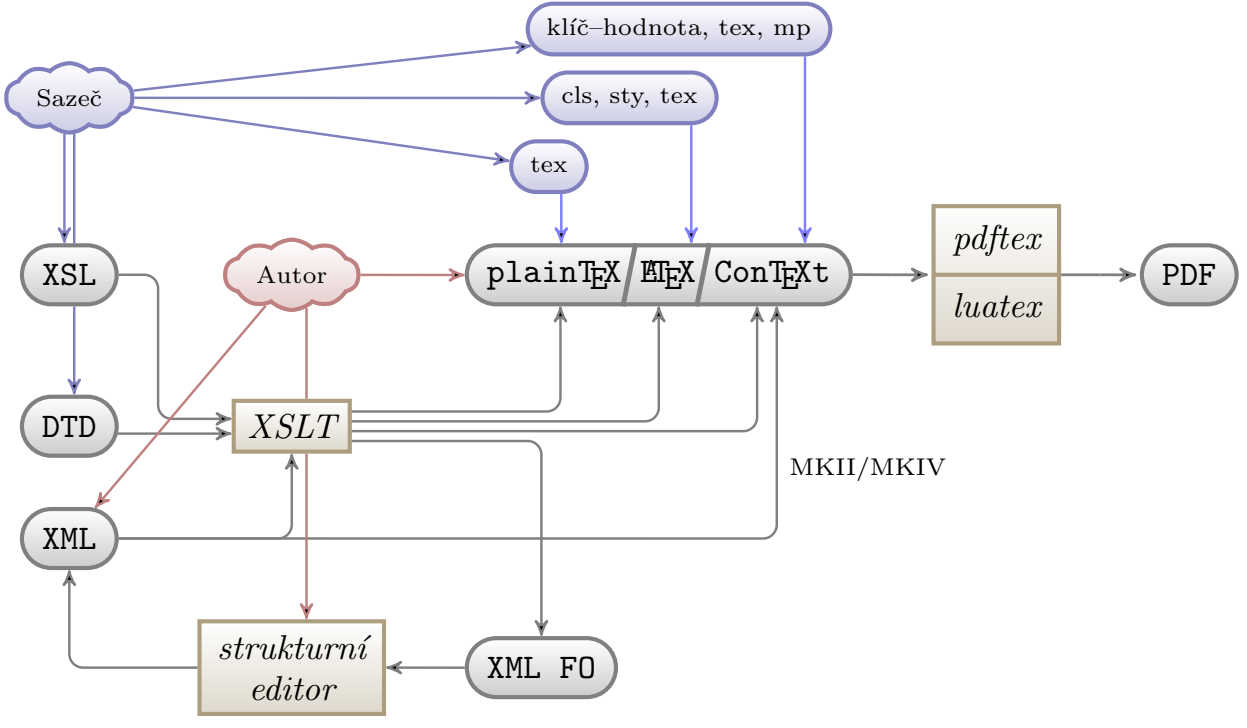
Formátování značkovacího jazyka (TEX)



Formátování značkovacího jazyka (XML)

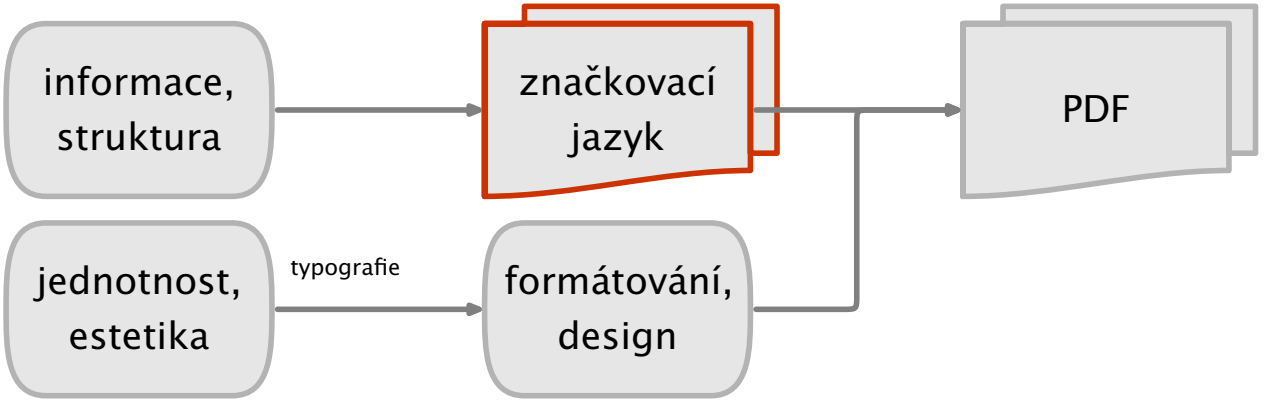


Formátování značkovacího jazyka (strukturní editor)



Shrnutí

Příprava dokumentů pro formátování



Řešení:

- značkovací jazyk;
- strukturní editor (nevím o žádném Open Free);
- formátování založené na TEXu.

Odkazy

[1] Robert Bringhurst. *The Elements of Typographic Style*. Hartley & Marks, Point Roberts, WA, USA, version 2.4 edition, 2001.

[2] Bohuslav Blažej. *Grafická úprava tiskovin*. SPN, 1. edition, 1990.

[3] Pavel Pop, Jindřich Fléger and Vladimír Pop. *Ruční sazba I*. Státní pedagogické nakladatelství Praha, 2. edition, 1989.

[4] Philip Taylor. Knižní úprava pro uživatele TEXu. část první: Teorie. In *Zpravodaj CSTUGu*, pages 20–37, 1995a. Překlad Ladislav Šenkyřík.

[5] Philip Taylor. Knižní úprava pro uživatele TEXu. část druhá: Praxe. In *Zpravodaj CSTUGu*, pages 38–60, 1995b. Překlad Ladislav Šenkyřík.

[6] Karel Dyrynk. *Typograf o knihách*. Kentaur Polygrafia, Praha, 3. edition, 1993. První vydání 1911.

[7] Karel Wick. *Pravidla matematické sazby*. Academia, Praha, 1. edition, 1966.

[8] Jean-Luc Dusong and Fabienne Siegwartová. *Typografie. Od olova k počítačům*. Svojtka a Vašut, 1. edition, 1997.

[9] Vít Zýka. Příprava dokumentů pro formátováníWW. *Zpravodaj Československého sdružení uživatelů TEXu*, 18(4):177–199, 2008a.
http://zyka.net/texts/formatovani-texperience08-bul-08-12-23.pdf

Jednou stonožka přebíhala z listu na list a…
zzzzzzzzzzzzzzzzzzaaaaaaaaaaaaaaaakkkkkkkkkkkkoooooooooooooooppppppppppppppllllllllllllllllllllllllllllllllllaaaaaaaaaaaaaa.
NNNNNNNNNNeeeeeeeeeeeeeeejjjjjjjjjjjjjjjjjjjjjjjjjjjddddddddddddddddřřřřřřřřřřřřřřřřřříííííííííííííííííííííííííííííííívvvvvvvvvvvvvvv
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nnnnnnnnnnnnnnooooooooooooohhhhhhhhhhhhhaaaaaaaaaaaa.
OOOOOOOOOO ppppppppppprrrrrrrrrrrrrrrvvvvvvvvvvvvvvvoooooooooooouuuuuuuuuuuuuu
nnnnnnnnnnnnnnoooooooooooohhhhhhhhhhhhhuuuuuuuuuuuuu
zzzzzzzzzzzzzzzzzzaaaaaaaaaaaaaaaakkkkkkkkkkkkoooooooooooooooppppppppppppppllllllllllllllllllllllllllllllllllaaaaaaaaaaaaaa
jjjjjjjjjjjjjjjeeeeeeeeejjjjjjjjjjjjjjjjjjíííííííííííííííííí ddddddddddrrrrrrrrrrrrrrrrruuuuuuuuuuuuhhhhhhhhhhhhhhhhááááááááááááá
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ooooooooo ddddddddddrrrrrrrrrrrrruuuuuuuuuuuuhhhhhhhhhhhhoooooooooooouuuuuuuuuuu
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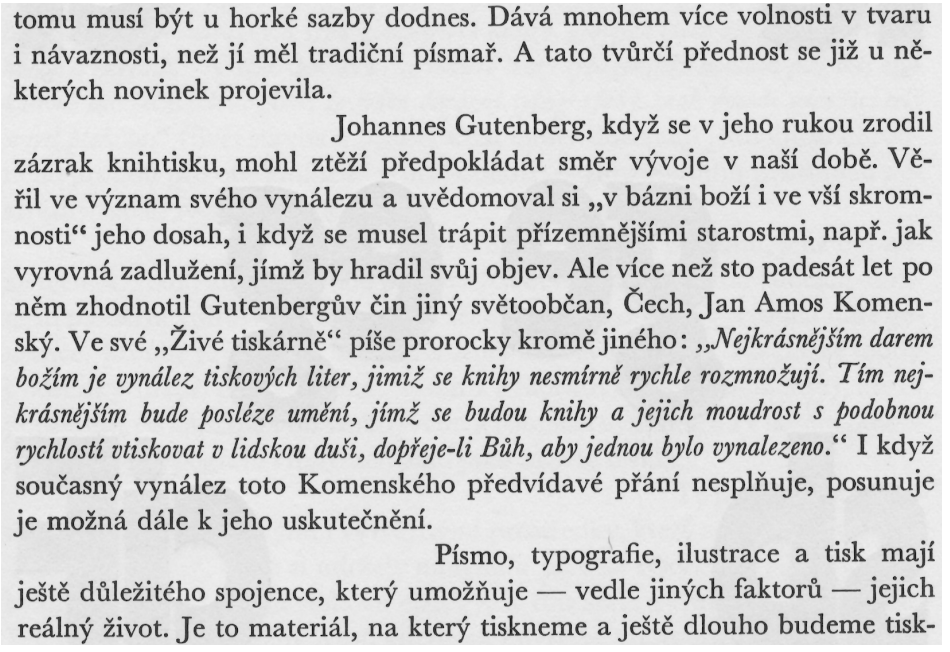
aaaaaaaaaaaaa tttttttttttttttttttttttttaaaaaaaaaaaaaaaakkkkkkkkkkkk ddddddddddáááááááááááááálllllllllllllllllllllllllllllll…
aaaaaaaaaaaaaažžžžžžžžžžžžžžžž zzzzzzzzzzzzzzzaaaaaaaaaaaaakkkkkkkkkkoooooooooooopppppppppppllllllllllllllllllllllaaaaaaaaaaaaa
iiiiiiiiiiiiiiiiiii jjjjjjjjjjjjjjjjjjjjeeeeeeeeeeejjjjjjjjjjjjjjjjjjjííííííííííííííííííííííí
sssssssssssssssssstttttttttttttttttttttttttáááááááááááááá nnnnnnnnnnnnnnnnnnooooooooooooohhhhhhhhhhhhhhhhaaaaaaaaaaaaaaaaaa
a ona zůstala omráčená ležet na zádech…
Po chvíli se probrala. To šimrání už se nedalo vydržet. Hlavu jí olizovala její sousedka lesní housenka…
„No konečně,“ oddechla si. „Už jsem si myslela, že tě neprobudím. Dokážeš se přetočit?“
„Jo, dík, ale potřebovala bych přidržet nohy!“
„Které!?“
„Ty sté!“
„Aha. Tak držím!“
„Jak se stočím, tak mě pusť!“
„Jo.“
Stonožka se svinula v pase, a jak ji housenka pustila, švihem se jako pružina překotoulela na svých sto noh.
„Děkuji ti, housenko,“ řekla stonožka a podala jí své první nohy.
„Za málo. Musím už ale běžet, mám zpoždění…“ rozloučila se housenka, rozeběhla se po listu a…
zzzzzzzzzzzzzzzzzzaaaaaaaaaaaaaaaakkkkkkkkkkkkoooooooooooooooppppppppppppppllllllllllllllllllllllllllllllllllaaaaaaaaaaaaaa
pppppppprrrrrrrrooooooo zzzzzzzzzmmmmmmmměěěěěěěěnnnnnnnnuuuuuuuu


květ v
Stříbrném podha
ní ke cti Luny
aloe pali sva



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Johannes Gutenberg, když se v jeho rukou zrodil zázrak knihtisku, mohl ztěží předpokládat směr vývoje v naší době. Věřil ve význam svého vynálezu a uvědomoval si „v bázni boží i ve vší skromnosti" jeho dosah, i když se musel trápit přízemnějšími starostmi, např. jak vyrovná zadlužení, jímž by hradil svůj objev. Ale více než sto padesát let po něm zhodnotil Gutenbergův čin jiný světoobčan, Čech, Jan Amos Komenský. Ve své „Živé tiskárně" píše prorocky kromě jiného: *„Nejkrásnějším darem božím je vynález tiskových liter, jimiž se knihy nesmírně rychle rozmnožují. Tím nejkrásnějším bude posléze umění, jímž se budou knihy a jejich moudrost s podobnou rychlostí vtiskovat v lidskou duši, dopřeje-li Bůh, aby jednou bylo vynalezeno."* I když současný vynález toto Komenského předvídavé přání nesplňuje, posunuje je možná dále k jeho uskutečnění.

Písmo, typografie, ilustrace a tisk mají ještě důležitého spojence, který umožňuje — vedle jiných faktorů — jejich reálný život. Je to materiál, na který tiskneme a ještě dlouho budeme tisk-

Obrázek 3: Odstavcová zarážka může mít různou podobu. Nejčastěji používané je odsazení prvního řádku dovnitř textu, ale někdy i vně, jako v tomto popisku. Též vertikální odsunutí odstavců je běžné. Méně časté je odsazení prvního řádku o šířku východového (posledního) řádku předchozího odstavce tak, jako v reprodukované ukázce z Typographie Oldřicha Hlavsy [12].

Též je možné oddělit odstavce speciálním znakem, nejčastěji ¶ (z latinského capitulum, anglicky zvaného pilcrow). Tento způsob se užíval hlavně ve středověku.

CHANGE POINT ANALYSIS OF ATMOSPHERIC RADIATION PROFILES

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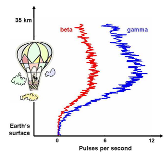
Summary

The poster presents a statistical analysis of the dependance of atmospheric radioactivity on the altitude. As a theoretical model explaining the physical background of this process is not known, two parametric regression models based on Richards growth curve are proposed. We discuss several computational challenges coming from the parameter estimating procedure and we focus on the choice of software suitable for calculations. The second part is devoted to the statistical analysis of changes in variance of our measurements. It appears that the random terms cannot be modelled by a series of i.i.d. random variables. On the contrary, the functional model consisting of three segments with two unknown change points seems to be much more appropriate. Assuming normal distribution of the error terms we propose test statistic for the detection of the linear trend in the variance and show its limit distribution. To complete the work, we estimate the change points and the variance parameters using several methods and study their properties.

I Meteorological experiment

Analyzed data come from Prague-Libuš upper air meteorological station of the Czech Hydrometeorological Institute, where every month the vertical profiles of beta and gamma radioactivity are measured by the radioactivity sonde system. The radioactivity sensor consisting of two Geiger-Müller gamma and beta tubes is a part of meteorological balloons which ascends from the earth's surface up to 35 km and detects short current pulses coming from the interaction between the radiation and the tube wall material.

After several "re-calculations" the complicated measurement process results into the data pairs $(x_i, y_i)_{i=1}^n$, where x represents the altitude and y the **average number of pulses per second** in the fixed altitude x. Let us note that y is proportional to the **radiation intensity**.



II Applied regression models

The first aim of the analysis was to suggest a parametric regression model $Y_i = m(X_i) + \varepsilon_i$, where $m(\cdot)$ represents mean amount of radiation and ε_i a random "error" term. As described by Hlubinka (2004), the models $m(\cdot)$ are based on **Richards growth curve $R(x)$ and its derivative $r(x)$**. Unfortunately, Richards curve itself does not describe properly the measurements in low atmospheric layers. That's why we propose two extended additive models. The first model consists of $r(x)$ and a **simple linear function**, meanwhile the second model of $r(x)$ and **logistic growth curve** being of the form

$$m_1(x) = r(x) + ex + k;$$
$$m_2(x) = r(x) + e\Big(1 + \exp\{-f(x-g)\}\Big) + k.$$

III Computational challenges

We used the classical Least Squares method to estimate the unknown parameters of suggested models $m_1(x)$ and $m_2(x)$. Although the principle seems to be quite simple, the minimization procedure must be performed numerically resulting in several difficult computational problems and challenges.

Setting up the initial parameters

Numerical methods need initial parameters estimators to start the procedure with. The key to set up appropriate initial parameters is to understand their interpretation. The choice of starting points resulting from the analysis of the parameters is described in detail by Hlubinka (2004).

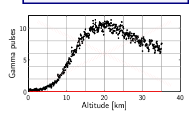
Numerical non-stability

The numerical stability of the minimization procedure is influenced by several factors. Because of the analytic form of $r(x)$ one must pay attention on **representation of small numbers**, exclude **non-sense values of parameters** and think about **appropriate data scaling**.

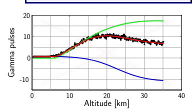
Choice of software

Almost every statistical or mathematical software offers some implementation of numerical methods suitable for the Least Squares minimization. However, not all implementations are able to solve our, quite complicated, problem with **6 (or 8) parameters** to be estimated. Notice that we wish not only to obtain the reasonable fit of the data, but we require that the estimated **submodels** (e.g. $r(x)$ and the logistic curve) and their parameters are **interpretable**. To obtain the best possible parameterization we applied the optimization procedure implemented in several software packages. **Finally, we decided for Matlab, Release 13, and its `lsqcurvefit` function.**

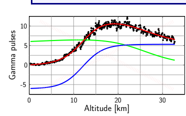
Methods implemented in **R** and **S Plus** softwares **do not convergate** at all, even if the initial parameters are set up to the "optimal" solution provided by Matlab.

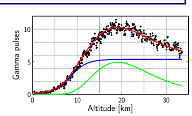


Mathematica 5 offers, as default, one extremely rapid function (`FindFit`). However, it sometimes results into **non-sense and uninterpretable parametrizations** as shown in the figure.



Matlab, Release 13, contains two suitable functions. Presented **results were obtained** by more sophisticated `lsqcurvefit` function from the `Optimization Toolbox` (right figure), while the simplier `nlinfit` function from the `Statistics Toolbox` convergates into uninterpretable parametrizations (left figure).



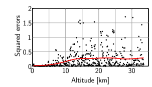


IV Analysis of variability

Radioactivity measurements evidently show heteroscedasticity. The goal was to suggest a suitable parametric model, estimate its parameters and study its properties.

Parametric model

It appears that the errors ε_i cannot be modelled by a series of i.i.d. random variables. To gain an idea about a suitable parametric model for the variance, we fitted squared errors using a kernel estimator as shown in the figure. Based on this estimation, the parametric functional model for $\sigma^2(x_i) = \text{var}\, Y_i$ in the form of



$$\sigma^2(x) = \sigma^2 + \delta^2 \left[\frac{x - x_s}{x_t - x_s} I\big(x \in (x_s, x_t\rangle\big) + I\big(x \in (x_t, \infty)\big)\right]$$

seems to be much more appropriate. Having two unknown real parameters $\sigma^2 > 0$ and $\delta \geq 0$ it consists of three segments and may change its behavior in two **unknown** altitudes (two unknown change points x_s and x_t).

Change point detection

$$\begin{aligned} &\text{H:}\ \ \sigma^2(x) = \sigma^2, && \forall x \in \langle x_1, x_n\rangle \\ &\text{A:}\ \exists x_s, x_t \in \{x_1, x_2, \ldots, x_n\}, && x_s < x_t, \\ &\quad \sigma^2(x) = \sigma^2, && 0 \leq x \leq x_s, \\ &\quad\quad = \sigma^2 + \frac{x - x_s}{x_t - x_s}\delta^2, && x_s < x \leq x_t, \\ &\quad\quad = \sigma^2 + \delta^2, && x_t < x \leq x_n. \end{aligned}$$

A natural question appears: **Is the variance constant or not?** More precisely, the question is how to perform a statistical test of the **hypothesis of a constant variance** against the **alternative of two unknown change points**. Assuming independent $Y_i \sim N(m(x_i), \sigma^2(x_i))$ and being inspired by Gupta and Ramanayake (2001), we propose a test statistic and show its limit distribution. Main ideas and key steps are summarized in the box below. The formal, very long and tedious proof is available on request.

1 TRANSFORMATION

Assuming independent and normal U_i we get

$$W_j = \frac{\sigma^2_{2j-1}}{2} \frac{U^2_{2j-1} + U^2_{2j}}{\sigma^2_{2j}} \sim \text{Exp}(\sigma^2_{2j-1})$$

2 MAXIMUM LIKELIHOOD APPROACH

For fixed change points s and t we have ML ratio

$$l_{s,t}(\sigma^2, \delta^2) = \prod_{j=1}^{n/2} \frac{f_A(W_j)}{f_H(W_j)}.$$

Using the **sum-type principle**, for unknown s, t we obtain the test statistic in the form of

$$T = const. \cdot \frac{\sum \gamma_j W_j}{\sum W_j}$$

3 MOMENTS OF T

To calculate moments of T denote

$$Z_j = W_j \left(\sum_{k=1}^{n/2} W_k\right)^{-1}.$$

The vector $(Z_2, Z_3, \ldots, Z_{n/2})'$ has $n/2 - 1$ dimensional Dirichlet distribution with all parameters equal 1. Moments of T can be easily calculated using moments of Z for fixed n.

4 LIMIT DISTRIBUTION

The test statistic has asymptotic normal distribution, i.e.

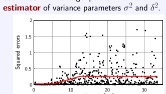
$$V = \frac{T - \text{E}T}{\sqrt{\text{var}\, T}} \sim \text{N}(0,1)$$

and $n = 100$ is enough to use its asymptotic properties.

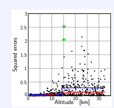
Estimators

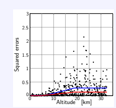
As expected, we rejected the null hypothesis for all data sets. To complete the study we have to estimate the change points and the parameters σ^2 and δ^2 of the segmented model. We suggested estimators based on the **Least Squares** method, **Weighted Least Squares** method and the L_1 approach using **Iteratively Weighted Least Squares** method and the **linear programming**. **L_1 approach seems to be satisfactory for the change points estimations, on the contrary LS and WLS methods are much more appropriate for estimating the variance parameters.**

The **optimal estimator** combines the **L_1-estimator** for change points with the **WLS-estimator** of variance parameters σ^2 and δ^2.



Warning !!! As shown in the figures, the change points estimators based on the Least Squares methods (blue line) are extremely **sensitive to the "outliers"**. On the contrary, L_1 approach (red line) provides much more stable estimations.





V Future plans

The presented work should be understood as the first step in analyzing atmospheric radiation. However, a lot of interesting statistical and meteorological questions still remain without satisfactory answers. Among them, we would like to focus mainly on the following:

- how to **detect a seasonality** in our measurements when considered as functional data;
- how to **estimate quantiles** of the radiation in different altitudes to be able to set up an alarm system;
- how to **improve numerical methods** to obtain more stable parameterizations of proposed models.

Acknowledgement. Author would like to express his thanks to Prof. Jaromír Antoch for his generous support, valuable comments and help. The poster was supported by grants GAČR 201/03/0945 and MSM 113200008.

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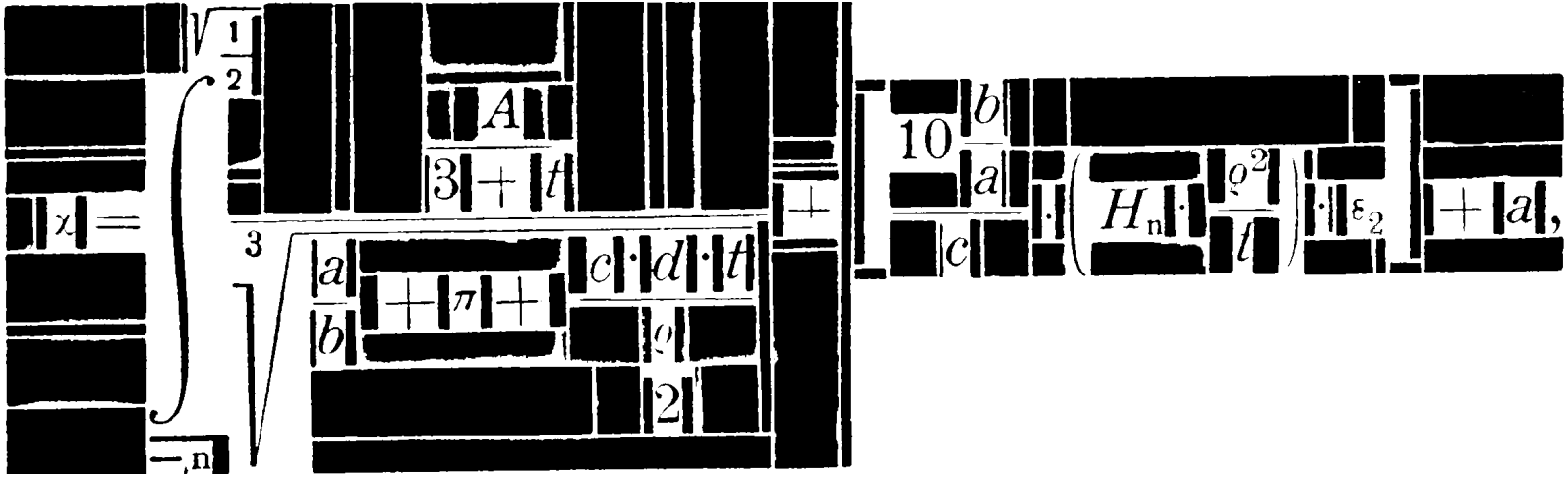
[3] Prchal L. (2004). *Nonparametric estimators for the functional data analysis* (in Czech). Master thesis, MFF UK, Praha.



Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all

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stretch 25 shrink 25 step 5

We thrive in information–thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeonhole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsize, winnow the wheat from the chaff and separate the sheep from the goats.

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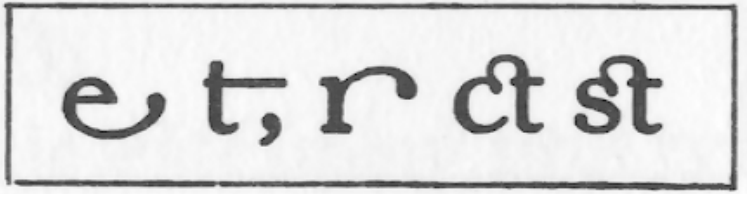
vě přikročeno k sazbě. Aby písmo bylo maleb-
nější, nakreslil umělec od jednotlivých typů
několik způsobů ⟨**e e e a a t t k K**⟩ a určil kde
kterých upotřebovat, aby řádky byly světlem
vyrovnané; pokusmo stanovil šířku mezer
mezi slovy, úpravu titulků atd. A pro každou

Úmyslně zvolen větší stupeň, tercie, aby bylo dosaženo i vnějšího souhlasu s vážným, slavnostním, evangelickým obsahem knihy. Ježto by bylo nemožno tak velké a široké písmo typograficky správně sázet na šířku 20 cicer, bylo nutno je doplnit typy s prodlouženými



Domácí meta vznikne odstřižením rohů ze čtverce velikosti 43 cm, ostatní mety mají tvar čtverce o hraně 38 cm. Vnitřní hrana obdelníkového území pálkaře o rozměrech 91×213 cm je odsazena od hrany domácí mety o15 cm a přečnívá o 91 cm roh hřiště.

Hrají jej dvě mužstva (oficiálně o devíti členech). Hráči družstva v poli (polaři) mohou být kdekoliv v poli, jen nadhazovač a chytač musí být ve svém území. Družstva se pravidelně střídají ve hře na pálce i v poli. Směna je období hry, kdy totéž mužstvo hrálo na pálce i v poli. Ke střídání úloh dojde, pokud družstvo v poli dosáhne třetího autu.

Účelem hráče na pálce je správně odpálit, proběhnout metovou dráhu (dotknout se v pořadí první, druhé třetí a domácí mety) dříve, než je vyautován. Za takový oběh získá jeho mužstvo bod. Úkolem polařů je zabránit běžci v získání bodu tím, že jej autují dříve, než dokončí oběh.

Nadhazování

- Nadhazovač musí zaujnout postavení oběma nohama na zemi a musí se nohama dotýkat nadhazovací mety.

Výška znaku integrálu $\int$ ve vzorcích na zvláštním řádku je 26 bodů bez ohledu na výšku vzorce; v textu, kde se nemají vyskytovat zlomky s čitatelem a jmenovatelem nad sebou, nýbrž (v nezbytných případech) se šikmým lomítkem nebo se záporným exponentem, je znaménko integrálu $\int$ 12bodové, a to i v případě, že má meze.

$$\int_{-l}^{l} \left(\frac{\partial^2 u}{\partial x \, \partial t} \right)^2 \mathrm{d}x \; ; \quad \int_{-l}^{l} (\partial^2 u / \partial x \, \partial t)^2 \, \mathrm{d}x \, .$$

Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all these activities, literally hundreds of improvements would never have been made, because I would never have thought of them or perceived why they were important. But a system cannot be successful if it is too strongly influenced by a single person. Once the initial design is complete and fairly robust, the real test begins as people with many different viewpoints undertake their own experiments. Thus, I came to the conclusion that the designer of a new system must not only be the implementer and first large–scale user; the designer should also write the first user manual. The separation of any of these four components would have hurt TEX significantly. If I had not participated fully in all

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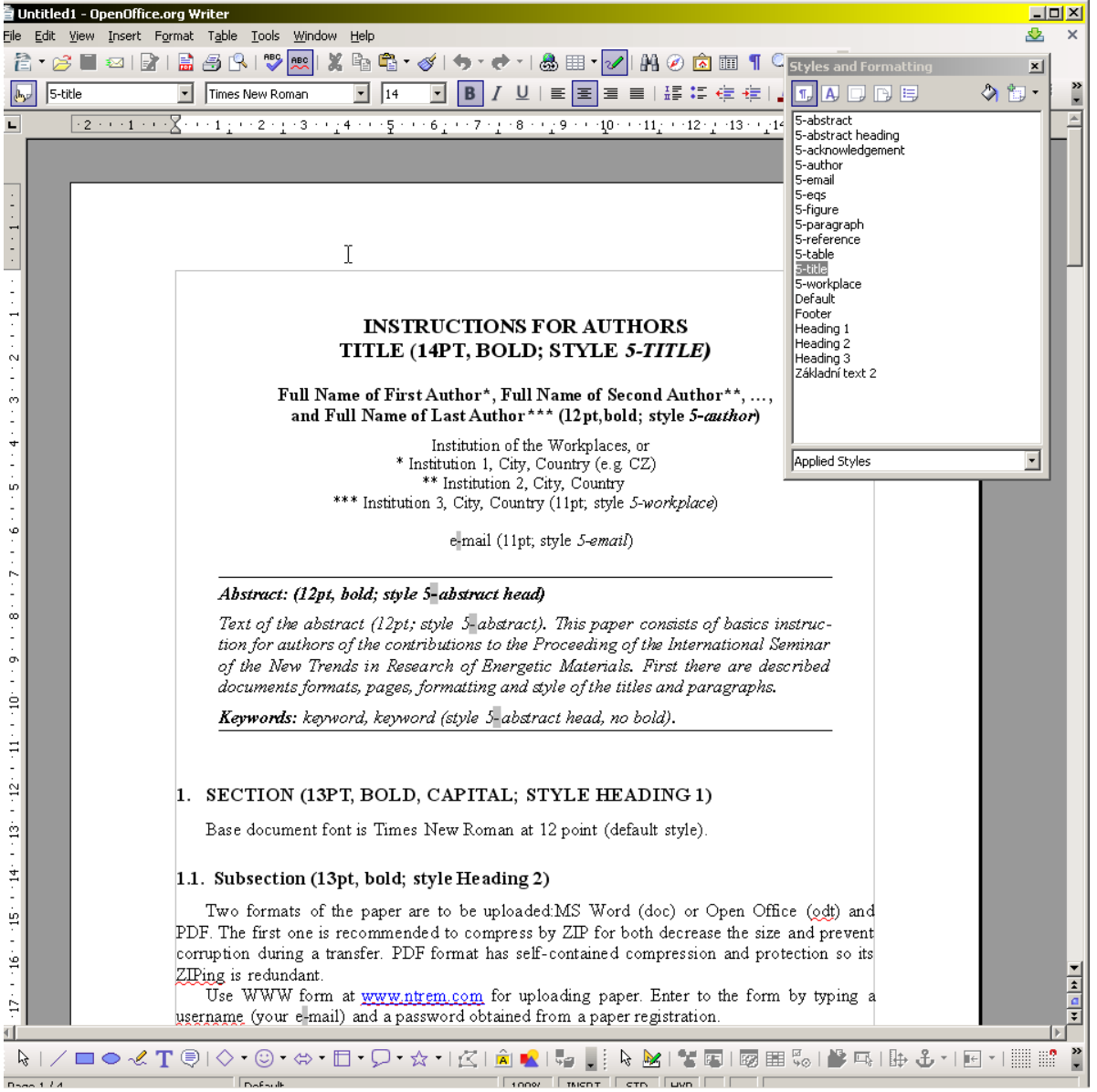
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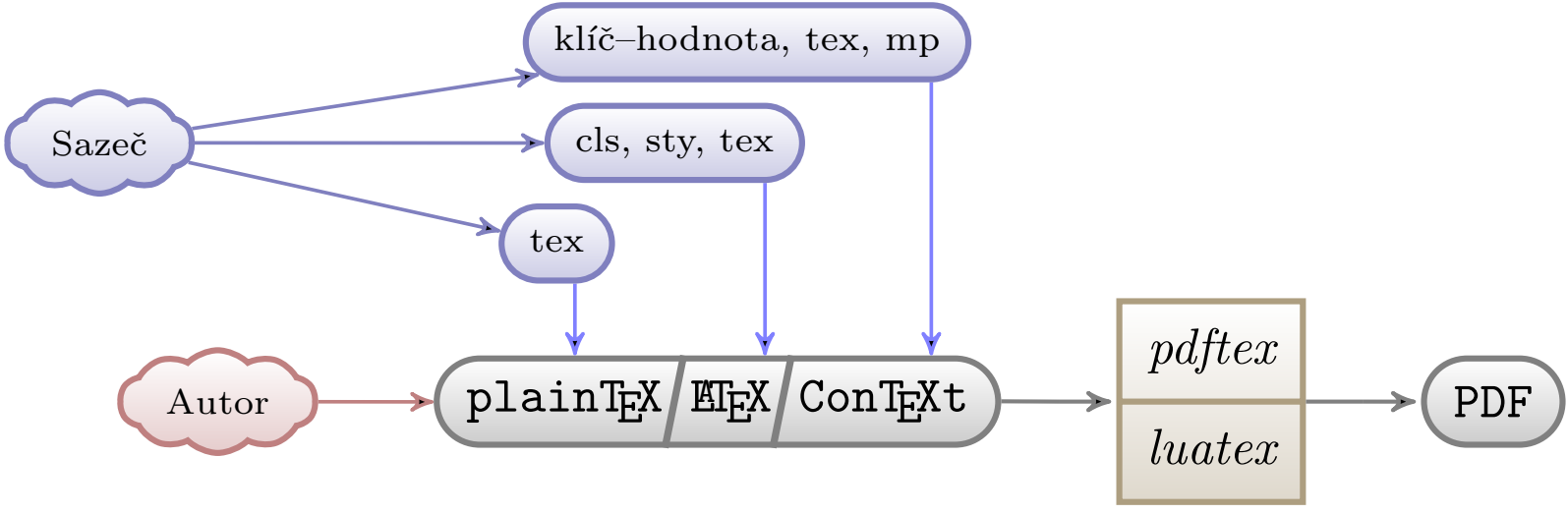
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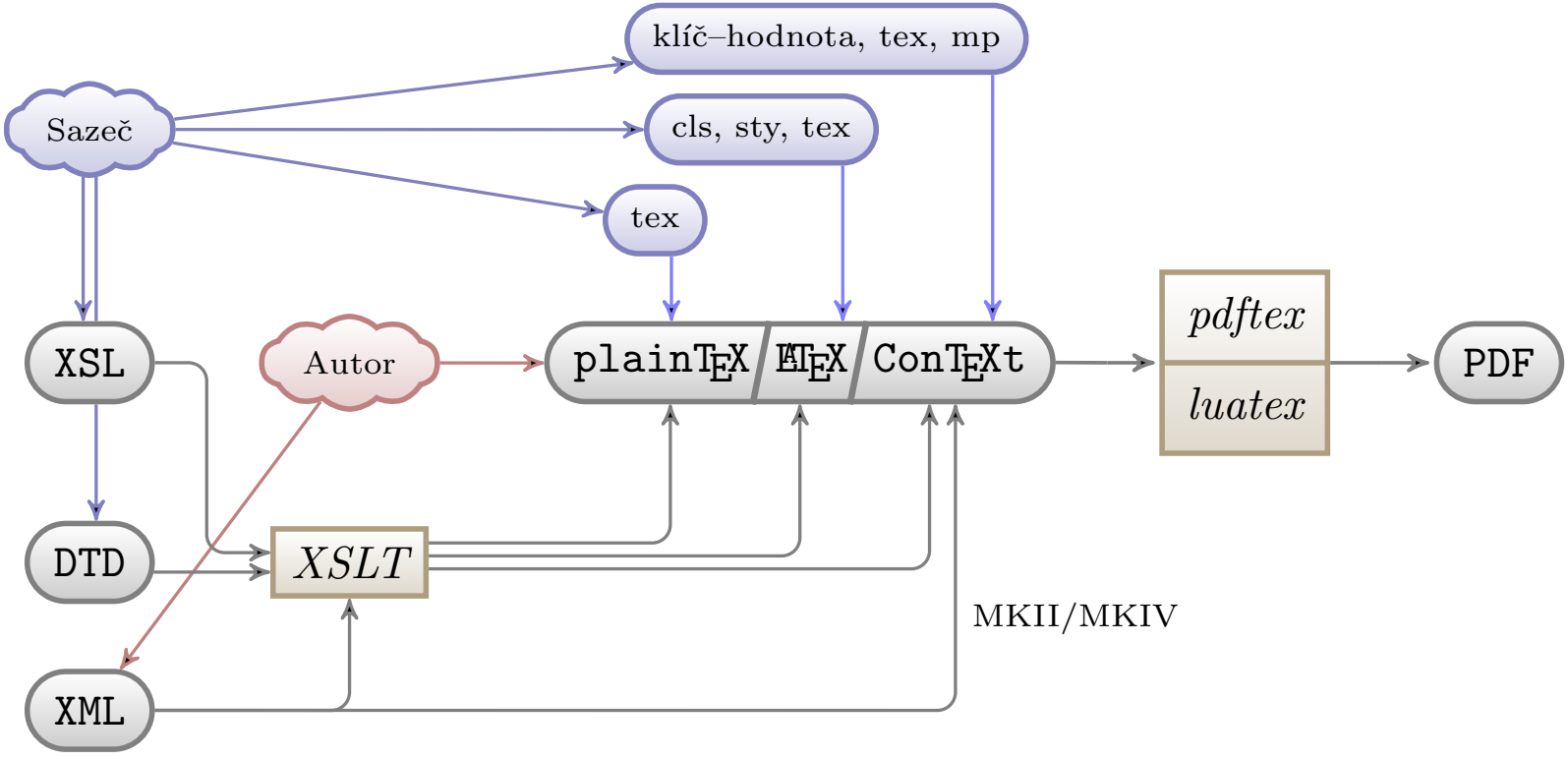
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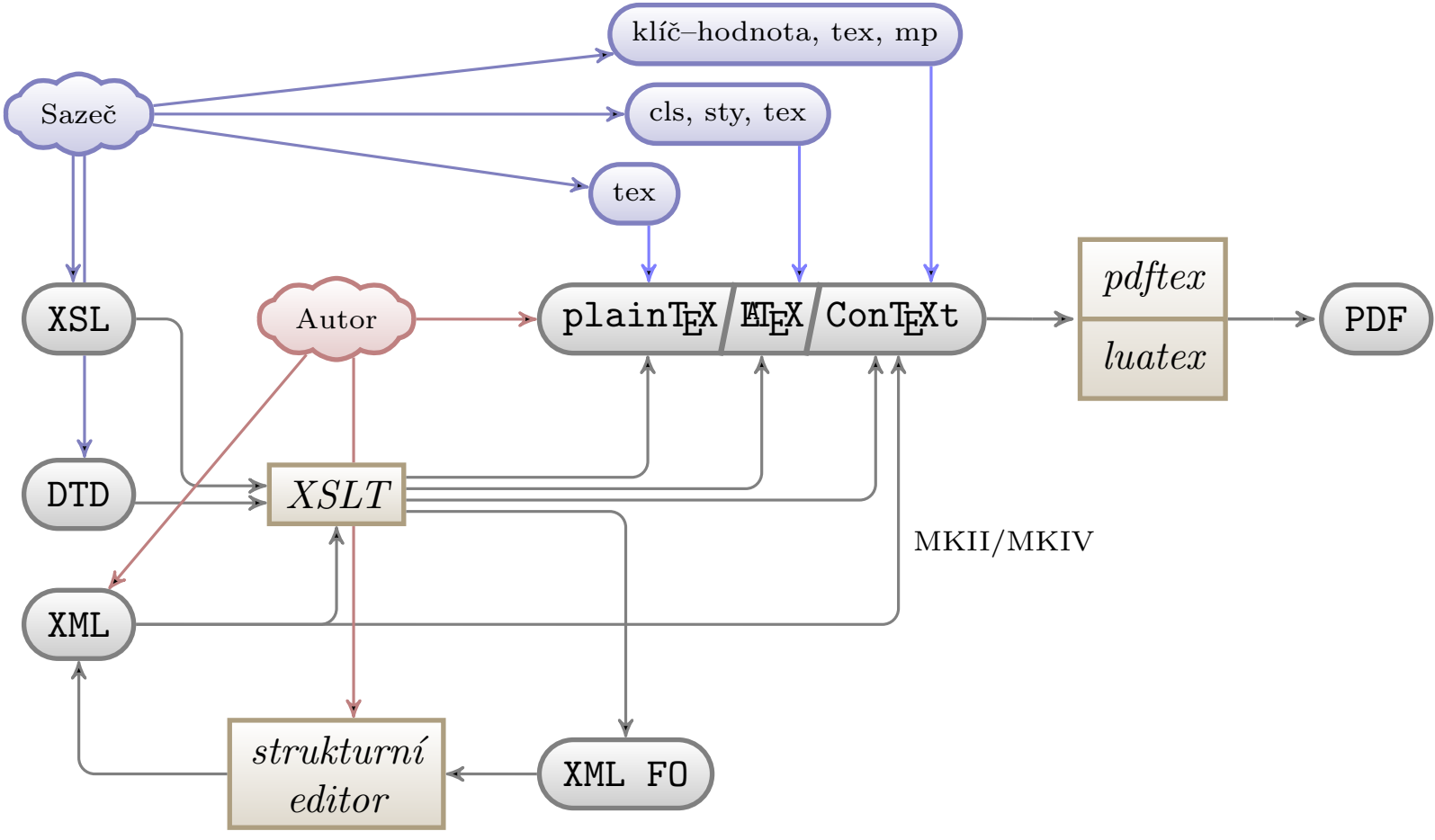
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