ERRATA

★ On the Cauchy problem for a class of hyperbolic operators whose coefficients depend only on the time variable, Tsukuba J. Math. 39-1 (2015), 121-163

- p123ℓ7$\uparrow$ $\Gamma(p(t,\cdot \to \Gamma(p(t(s),\cdot$
- p123ℓ1$\uparrow$ $h_k(t,\xi) \to h_k(t,\tau,\xi)$
- p136ℓ3$\uparrow$ $\#\{t \in \to \{t \in$
- p145ℓ3$\downarrow$ $+\Lambda_t^{-1} \to -\Lambda_t^{-1}$
- p152ℓ14$\downarrow$ $\mathcal{N}_1^0(p^{(1)} \to \mathcal{N}_1^0(p^{(1)})$

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- p134ℓ9$\downarrow$ $\equiv 0$. Write $\to$
  $\equiv 0$. Since $d_0(t,\xi;\varepsilon)d_1(t,\xi;\varepsilon) \in \mathcal{A}[\xi,\varepsilon]$, it follows from Lemma 2.1 that for any $T>0$ there is $N_{T,0} \in \mathbf{Z}_+$ such that

  $$\begin{aligned}&\#\{t \in [0,T];\ \lambda_j(t,\xi;\varepsilon)-\lambda_k(t,\xi;\varepsilon)=0\}\\ &(\,\#\{t \in [0,T];\ d_0(t,\xi;\varepsilon)d_1(t,\xi;\varepsilon)=0\}) \le N_{T,0}\end{aligned}$$

  if $\varepsilon \in \mathbf{R}\setminus\mathcal{N}_0^0$, $\xi \in S^{n-1}\setminus\mathcal{N}_0(\varepsilon)$, $1 \le j < k \le \hat{m}$ and $\lambda_j(t,\xi;\varepsilon)-\lambda_k(t,\xi;\varepsilon) \not\equiv 0$ in t. Write
- p136ℓ8$\downarrow$ $\le m \to \le \hat{m}$

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- p141ℓ1$\uparrow$ $+(i/2)\partial_t \to +(3i/2)\partial_t$
- p154 ℓ3$\downarrow$ $+\mathrm{Im} \to -\mathrm{Im}$
- p154 ℓ7$\downarrow$ $+\mathrm{Re} \to -3\,\mathrm{Re}$
- p154 ℓ8$\downarrow$ $p_1^{(1)}v_\varepsilon)\cdot\overline{v_\varepsilon}\} \to p_1^{(1)}v_\varepsilon)\cdot\overline{v_\varepsilon}\}/3$
- p154 ℓ3$\uparrow$ $-\sum_{j=1}^{3} \to -\sum_{j=1}^{2}$
- p154 ℓ2$\uparrow$ $|(\lambda_{2t}^{(1)}-\lambda_{1t}^{(1)})v_\varepsilon|^2/4 \to 9|(\lambda_{2t}^{(1)}-\lambda_{1t}^{(1)})v_\varepsilon|^2$

- p154 $\ell 1\uparrow$ $W_0^4\Lambda_t^{-1} \to W_0^4\Lambda_t^{-1}e^{-A\Lambda}$

★ On the Cauchy problem for second-order hyperbolic operators with the coefficients of their principal parts depending only on the time variable, Funkcialaj Ekvacioj 55 (2012), 99-136:

- p101$\ell 8\uparrow$ $\Gamma(p(t,\cdot \to \Gamma(p(t(s),\cdot$
- p114$\ell 12\downarrow$ $\psi(t,\xi') \to \psi_j(t,\xi')$
- p115$\ell 7\uparrow$ $\beta_2,(t) \to \beta_2(t)$
- p128$\ell 13\uparrow$ only in $\to$ only if
- p129$\ell 11\downarrow$ $\lambda(s) \to \lambda_1(s)$, $\lambda(0) \to \lambda_1(0)$

★ On the Cauchy problem for hyperbolic operators of second order whose coefficients depend only on the time variable, J. Math. Soc. Japan 62-1 (2010), 95-133:

- p96$\ell 2\downarrow$ $\xi_1^{\alpha_1},\cdots,\xi_n^{\alpha_n} \to \xi_1^{\alpha_1}\cdots\xi_n^{\alpha_n}$
- p100$\ell 8\uparrow\sim\ell 6\uparrow$ $U_{(t_0,x^0)} \to U_{(t_0,\xi^0)}$, $\Gamma_{(t_0,x^0)} \to \Gamma_{(t_0,\xi^0)}$
- p101$\ell 3\uparrow$ (A-a)$(t0,\xi 0)$ $\to$ (A-a)$_{(t_0,\xi^0)}$,
  (A-b)$(t0,x0,\xi 0)$ $\to$ (A-b)$_{(t_0,x^0,\xi^0)}$
- p104$\ell 1\downarrow$ $)^2 \to)^2)$
- p105$\ell 3\uparrow$ & $\ell 2\uparrow$ $T(\theta) \to (t_0+T(\theta),\theta)$
- p106$\ell 6\uparrow$ & $\ell 5\uparrow$ $T(\theta) \to (t_0+T(\theta),\theta)$
- p110$\ell 12\downarrow$ $\hat{u}_j(x) \to \hat{u}_j(\xi)$
- p123$\ell 9\downarrow$ $u_j(s_0,y;\rho)=0 \to u_0(s_0,y;\rho)=1$
- p124$\ell 8\uparrow$ functions $\to$ functions defined in $[0,\theta_0]$
- p124$\ell 7\uparrow$ $0\le\lambda_1 \to -t_0\le\lambda_1$
- p124$\ell 5\uparrow$ $[0,\theta_0]. \to (0,\theta_0].$
- p125$\ell 8\downarrow$ $\lambda_1(\theta)>0, \to \lambda_1(\theta)>0$ for $\theta\in(0,\theta_0]$,
- p128$\ell 2\downarrow$ $+(p_j+p)\tilde{\mu} \to +p\tilde{\mu}$

- p129ℓ1 $\downarrow\sim$ ℓ3 $\downarrow$ (3 places) $\quad \mathbf{R}^{n+2} \to \mathbf{R} \times S^{n-1} \times \mathbf{R}$
- p129ℓ7 $\uparrow$ & ℓ3 $\uparrow$ $\quad ; |\xi- \to ; |\xi|^2 = 1, |\xi-$
- p130ℓ1 $\downarrow$ $\quad ; |\xi- \to ; |\xi|^2 = 1, |\xi-$
- p130ℓ9 $\uparrow$ $\quad \Gamma \to (\Gamma \cap S^{n-1})$
- p130ℓ7 $\uparrow$ $\quad |t - t_k|^2. \to |t_k - t_0|^2.$
- p131ℓ1 $\downarrow$ $\quad \min_{\tau\in\mathcal{R}(\xi)} \to \min_{\tau\in\mathcal{R}(\tilde{\Xi}(\rho))}$

★ The C^∞-well posed Cauchy problem for hyperbolic operators dominated by time functions, Japanese J. Math. 30-2 (2004), 283-348 (with K. Kajitani and K. Yagdjian):

- p316ℓ13 $\uparrow$, p317ℓ7 $\downarrow$ and p320ℓ5 $\downarrow$ $\quad$ Delete "a conic neighborhood of"
- p317ℓ7 $\downarrow$ $\quad \chi(\widetilde{\mathcal{C}}_2), \ \to \ \chi(\widetilde{\mathcal{C}}_2)$ and

★ The Cauchy problem for hyperbolic operators dominated by time functions, Hyperbolic Problems and Related Topics, International Press, 2003, pp423-436:

- p429ℓ16 $\downarrow$ $\quad \text{Re}\ \beta^0(y,0,\eta') + |\,\text{Im}\ \beta^0(y,0,\eta')|$
  $\to \ \max\{\text{Re}\ \beta^0(y,0,\eta'), |\,\text{Im}\ \beta^0(y,0,\eta')|\}$

★ The Cauchy problem for a class of hyperbolic operators with double characteristics, Funkcialaj Ekvacioj 39-2 (1996), 235-307 (with K. Kajitani):

- p238ℓ2 $\downarrow$ $\quad e(y,\eta') \ \to \ e(y,\eta)$
- p238ℓ11 $\downarrow$ $\quad C_2(y,n') \ \to \ C\alpha(y,\eta')$
- p239ℓ13 $\downarrow$ and p240ℓ6 $\downarrow$ $\quad$ The term "$T(y,0,\eta'')^{-2}\alpha(y,0,\eta'')/|\eta''|$" can be dropped.
- p240ℓ4 $\uparrow$ $\quad$ The term "$C_1\alpha(y,0,\eta'')^{1/2}$" can be dropped.
- p253ℓ11 $\downarrow$ $\quad g_j$ temperate in $\cdots$ ($j = 1, 2$).
  $\to$ G temperate in $\cdots$ ($j = 1, 2$), where $G = (g_1 + g_2)/2$.
- p253ℓ16 $\downarrow$ $\quad D''$), $a \cdots a(x,\xi'')$ and $G = (g_1 \oplus g_2)/2$
  $\to$ D'') and $a \cdots a(x,\xi'')$.
- p265ℓ11 $\downarrow$ $\quad -e_s(y,\eta) \ \to \ -e_s(y,\eta))$

- p267ℓ15 ↑ $\tilde{d} \to \tilde{d}_1$

★ Microlocal *a priori* estimates and the Cauchy problem II, Japan. J. Math. 20-1 (1994), 1-71 (with K. Kajitani):

- p12ℓ7 ↑ $\widetilde{\mathcal{C}} \ni \to \chi : \widetilde{\mathcal{C}} \ni$
- p12ℓ7 ↑ $(y, \eta) \in \mathcal{C} \to (x, \xi) \in \mathcal{C}$
- p16ℓ4 ↑ $(2n+1)! \to (2n)!$
- p29ℓ8 ↑ $u(w)\, dy \to u(w)\, dw$
- p38ℓ7 ↑ $\Theta_{h/2}(y, \eta) \to \Theta_{h/2}(\eta)$
- p39ℓ11 ↑ $\mathcal{E}_s(y, \eta; \to \mathcal{E}_s(y, D;$
- p48ℓ9 ↑ $r(x, D) \to r(y, D)$
- p61ℓ8 ↓ $\tilde{w}(y, \eta; \gamma)) \to \tilde{w}(y, \eta; \gamma)\vartheta)$

★ Microlocal *a priori* estimates and the Cauchy problem I, Japan. J. Math. 19-2 (1993), 353-418 (with K. Kajitani):

- p354ℓ1 ↓ $\langle \xi' \rangle^{\delta|\beta| - \rho|\alpha'|} \to \langle \xi' \rangle^{m + \delta|\beta| - \rho|\alpha'|}$
- p354ℓ20 ↑ real-valued → bounded real-valued
- p354ℓ20 ↑ $C^2(\mathcal{C}_2) \to C^\infty(\mathcal{C}_2)$
- p375ℓ5 ↓ Delete "(3.2)"
- p375ℓ9 ↓ $\|\langle D \rangle \to (3.2) \quad \|\langle D \rangle$
- p387ℓ7 ↓ taht → that
- p401ℓ10 ↑ $D; \gamma; B) \to D; \gamma'; B)$
- p407ℓ10 ↓ $\times \tilde{\psi}_\gamma \to \times \psi_\gamma$
- p407ℓ10 ↑ $\tilde{\mathcal{R}}(x, \xi; \to \tilde{\mathcal{R}}(x, D;$

★ Propagation of singularities for several classes of pseudodifferential operators, Bull. Sc. math., 2 serie 115 (1991), 397-449 (with K. Kajitani):

- p435ℓ5 ↑ $= \nabla_\xi \Lambda(\to = \nabla_\xi \varphi($

- p436ℓ11$\downarrow$ $\mathcal{C}_0 \ \to \ \mathcal{C}_0$ of z^0
- p437ℓ10$\uparrow$ $-\mathcal{V}(z) \ \to \ -\widetilde{\mathcal{V}}(z)$
- p440ℓ11$\uparrow$ $\lambda(x,\xi')|, \ \to \ \lambda(x,\xi')|^2,$
- The argument from p446ℓ16$\downarrow$ to p447ℓ9$\downarrow$ can be simplified as follows: Now assume that $1 \le k \le \ell$ and $z^0 \notin WF(x_1^k u)$. Since

  $$x_1^{k-1}P(x,D)u = D_1(x_1^k u) + (q(x',D') + ik)(x_1^{k-1}u),$$

  we have $z^0 \notin WF((q(x',D')+ik)(x_1^{k-1}u))$. The assumptions in Theorem 6.1 implies that $iq_0(0;0,\cdots,0,1) \notin \mathbf{N}$, *i.e.*, $q(x',D')+ik$ is elliptic at z^0. Thus we have $z^0 \notin WF(x_1^{k-1}u)$.

★ The hyperbolic mixed problem in Gevrey classes, Japan. J. Math. 15 (1989), 309-383 (with K. Kajitani):

- p313ℓ6$\downarrow$ $([0,);\ \to\ ([0,\infty);$
- p319$\ell\uparrow$ thatr $'_0 \ge$ $\to$ that $r'_0 \ge$
- p324ℓ2$\downarrow$ $-i\Gamma_{x'} \ \to \ -i\dot{\Gamma}_{x'}$

★ Microhyperbolic operators in Gevrey classes, Publ. RIMS, Kyoto Univ. 25-2 (1989), 169-221 (with K. Kajitani):

- p178ℓ4$\downarrow$ $\delta_1 \oplus \delta_2 \ \to \ \delta_1 + \delta_2$
- p189ℓ8$\downarrow$ $\xi.y, \ \to \ \xi, y,$
- p190ℓ7$\downarrow$ and ℓ12$\downarrow$ $\ge \ \to \ \le$
- p190ℓ4$\uparrow$ $\cap(\xi \ \to \ \cap\{\xi$
- p191ℓ4$\downarrow$ and ℓ13$\uparrow$ $\phi \ \to \ \emptyset$
- p191ℓ13$\uparrow$ $(\cap\mathcal{C}_2 \ \to \ \cap(\mathcal{C}_2$
- p191ℓ1$\uparrow$ $\equiv \varepsilon_1 \ \to \ \equiv \hat{\varepsilon}_1$
- p193ℓ7$\uparrow$ $c_{d^1} \ \to \ c_{d_1}$
- p194ℓ4$\downarrow$ $(1/p(x,\xi) \ \to \ (1/p(x,\xi))$
- p205ℓ1$\downarrow$ $\mathbf{C}^n. \ \to \ \mathbf{C}^n,$

- p213ℓ13 $\downarrow$ taht $\rightarrow$ that
- p214ℓ15 $\downarrow$ $H^m_{a(\Lambda'_h+bw_h)} \rightarrow H^m_{a(\Lambda'_h+bW_h)}$ (two places)
- p216ℓ12 $\downarrow$ $(PQf - f \rightarrow (pQf - f$
- p216ℓ2 $\uparrow$ $WP_* \rightarrow WF_*$
- p218ℓ12 $\downarrow$ tath $\rightarrow$ that

★ Remarks on hyperbolic polynomials, Tsukuba J. Math. 10-1 (1986), 17-28:

- p18ℓ10 $\downarrow$ $X\times \rightarrow U\times$ $\leftarrow$ '06.7.14
- p19ℓ4 $\downarrow$
  the $\alpha_j(b_1, \cdots, b_m)$ are continuous functions of $(b_1, \cdots, b_m) \in \mathbf{C}^m$.

  $\rightarrow$

  $\mathbf{C}^m \ni (b_1, \cdots, b_m) \mapsto \{\alpha_1(b_1, \cdots, b_m), \cdots, \alpha_m(b_1, \cdots, b_m)\} \subset \mathbf{C}$ is a multi-valued continuous function. $\leftarrow$ '06.7.14
- p21ℓ13 $\uparrow$ for $\theta \in [0, 1]$. $\rightarrow$
  for $\theta \in [0, 1]$. About the choice of a continuous function $s(\theta)$ we refer to Theorem 5.2 of Chapter II of "T. Kato, Perturbation Theory for Linear Operators, Springer-Verlag, Berlin-Heidelberg-New York,1980"

★ Singularities of solutions of the Cauchy problem for hyperbolic systems in Gevrey classes, Japan. J. Math. 11-1 (1985), 131-175:

- p161ℓ4 $\downarrow$ $D^\beta_x \partial^\alpha p(x, \xi) \rightarrow D^\beta_x \partial^\alpha_\xi p(x, \xi)$
- p164ℓ3 $\downarrow$ $\widetilde{L}^{(\alpha)}_{(\mu)} \rightarrow \widetilde{L}^{(\alpha)}_{(\beta)}$
- p172ℓ11 $\downarrow$ – ℓ16 $\downarrow$ $\rightarrow$

$$
\begin{aligned}
&\le 2^{-1}\Big\{ \sum_\beta |D_x^{\alpha+\beta}\psi(x)|\, |y|^{|\beta|} b_{|\beta|} |\chi'(b_{|\beta|}|y|)|/\beta! \\
&\quad + \sum_\beta |D_x^{\alpha+\beta}\partial_{x_j}\psi(x)|\, |y|^{|\beta|} |\chi(b_{|\beta|}|y|) - \chi(b_{|\beta|+1}|y|)|/\beta! \Big\} \\
&\le C|y|^k A^{|\alpha|} \Big\{ \sum_\beta (|\alpha|+|\beta|)!^{\kappa_1} A^{|\beta|} (B|y|/h)^{|\beta|-k} b_{|\beta|} (h/B)^{|\beta|-k} \\
&\quad \times |\chi'(b_{|\beta|}|y|)|/\beta! + \sum_\beta (|\alpha|+|\beta|+1)!^{\kappa_1} A^{|\beta|} (B|y|/h)^{|\beta|-k} \\
&\quad \times (h/B)^{|\beta|-k} |\chi(b_{|\beta|}|y|) - \chi(b_{|\beta|+1}|y|)|/\beta! \Big\} \\
&\le C'(B|y|/h)^k (2^{\kappa_1}A)^{|\alpha|} |\alpha|!^{\kappa_1} k!^{\kappa_1 - 1} \sum_\beta \{ B|\beta|^{\kappa_1-1} \\
&\quad \times (|\beta|!|\beta|^k/(k!|\beta|^{|\beta|}))^{\kappa_1-1} + (|\beta|+1)^{\kappa_1-2} \\
&\quad \times ((|\beta|+1)!(|\beta|+1)^k/(k!(|\beta|+1)^{|\beta|+1}))^{\kappa_1-1} \} (2^{\kappa_1+1} nhA/B)^{|\beta|}.
\end{aligned}
$$

Since $|\beta|!|\beta|^k/(k!|\beta|^{|\beta|}) \le 1$, taking $B > 4^{\kappa_1} nhA$, we have (2.28). Q.E.D.

- p174ℓ5$\uparrow$ $(x^0,\xi^0) \in {}^*\mathbf{R}^n \ \to\ (x^0,\xi^0) \in T^*\mathbf{R}^n$

★ The mixed problem for hyperbolic systems, Proc. NATO Advanced Study Institutes on Singularities in boudary value problems, Series C, D. Reidel,1981, 327-370:

- p365ℓ14$\uparrow$ $\notin WF_0 \ \to\ \in WF_0$

★ The Cauchy problem for operators with constant coefficient hyperbolic principal part and propagation of singularities, Japan. J. Math. 6 (1980), 179-228:

- p180ℓ12$\uparrow$ and ℓ11$\uparrow$ $\mathcal{D}^{\{\kappa\},h} \ \to\ \mathcal{D}_K^{\{\kappa\},h}$
- p183ℓ11$\uparrow$ $\varepsilon \le r_1 \ \to\ \varepsilon \le \varepsilon_1$
- p185ℓ12$\downarrow$ supp $\to$ sup
- p187ℓ12$\downarrow$ Lemm $\to$ Lemma
- p189ℓ7$\downarrow$ $q(s) \ \to\ q_0(s)$

- p193ℓ6 $\uparrow$ and ℓ3 $\uparrow$ $f(\nu, r, \zeta, s, t \ \to\ f(\nu, r, \zeta, t$
- p209ℓ4 $\uparrow$ $-is^{-\sigma}\zeta) \ \to\ +s^{-\sigma}\zeta)$ $\leftarrow$ '06.7.13

★ Analytic wave front sets of the Riemann functions of hyperbolic mixed problems in a quarter-space, Publ. RIMS, Kyoto Univ. 11-3 (1976), 785-807:

- p785ℓ15 $\uparrow$ Garding $\to$ Gårding
- p787ℓ6 $\uparrow$ $+\Gamma_0 \ \to\ +\Sigma_0$
- p789ℓ1 $\downarrow$ $i\Gamma \ \to\ i\dot{\Gamma}$
- p789ℓ3 $\uparrow$ $\to\ \widetilde{R}_0(\zeta') = 0\} \cup (-i\partial\dot{\Gamma}))\}.$
- p790ℓ7 $\downarrow$ $\Sigma \ \to\ \dot{\Sigma}$

★ The principle of limit amplitude for symmetric hyperbolic systems of first order in the half-space $\mathbf{R}^n_+$, Publ. RIMS, Kyoto Univ. 11-1 (1975), 149-162:

- p161ℓ1 $\downarrow$ $f(x)\,dx \ \to\ h(x)\,dx$