6 付録

6.1 付録 A

((72) 式の証明)

(証明) (31) 式と補助定理 4 から (71) 式は次のように求められる：

(i) $2\lfloor H \rfloor \leq (N-1)$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty} \int_{-kh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\tilde{\psi}_0(t) - {}^{m}_{\bullet}\psi_0(t) \right|^2 dt \\
= \ & \sum_{k=-\infty}^{-\lfloor H \rfloor} \int_{-kh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt + \sum_{k=-\lfloor H \rfloor+1}^{\lfloor H \rfloor-1} \int_{-Hh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt \\
& + \sum_{k=\lfloor H \rfloor}^{N-\lfloor H \rfloor-1} \left\{ \int_{-kh}^{-Hh} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt + \int_{Hh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt \right\} \\
& + \sum_{k=N-\lfloor H \rfloor}^{N+\lfloor H \rfloor-2} \int_{-kh}^{-Hh} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt + \sum_{k=N+\lfloor H \rfloor-1}^{\infty} \int_{-kh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt \\
\leq \ & \sum_{k=-\infty}^{-\lfloor H \rfloor} \int_{-kh}^{(N-1-k)h} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{2t/h} dt + \sum_{k=-\lfloor H \rfloor+1}^{\lfloor H \rfloor-1} \int_{Hh}^{(N-1-k)h} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{2t/h} dt \\
& + \sum_{k=\lfloor H \rfloor}^{N-\lfloor H \rfloor-1} \left\{ \int_{-kh}^{-Hh} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{-2t/h} dt + \int_{Hh}^{(N-1-k)h} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{2t/h} dt \right\} \\
& + \sum_{k=N-\lfloor H \rfloor}^{N+\lfloor H \rfloor-2} \int_{-kh}^{Hh} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{-2t/h} dt + \sum_{k=N+\lfloor H \rfloor-1}^{\infty} \int_{-kh}^{(N-1-k)h} \frac{({}^{m}W)^2}{h^2} ({}^{m}w)^{-2t/h} dt \\
= \ & -\frac{(N-1)({}^{m}W)^2({}^{m}w)^{2H}}{h \ln({}^{m}w)}.
\end{aligned}
\tag{111}
$$

(ii) $2\lfloor H \rfloor \geq (N+1)$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty} \int_{-kh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\tilde{\psi}_0(t) - {}^{m}_{\bullet}\psi_0(t) \right|^2 dt \\
= \ & \sum_{k=-\infty}^{-\lfloor H \rfloor} \int_{-kh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt + \sum_{k=-\lfloor H \rfloor+1}^{N-\lfloor H \rfloor-1} \int_{Hh}^{(N-1-k)h} \left| {}^{m}_{\bullet}\psi_0(t) \right|^2 dt
\end{aligned}
$$

$$
\begin{aligned}
&+\sum_{k=N-\lfloor H\rfloor}^{\lfloor H\rfloor-1}\int_{-kh}^{(N-1-k)h}\left|{}^{m}_{*}\tilde{\psi}_0(t)-{}^{m}_{*}\psi_0(t)\right|^2dt\\
&+\sum_{k=\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-kh}^{Hh}\left|{}^{m}_{*}\psi_0(t)\right|^2dt\\
&+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}_{*}\psi_0(t)\right|^2dt\\
\leq\ &\sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{2t/h}dt+\sum_{k=-\lfloor H\rfloor+1}^{N-\lfloor H\rfloor-1}\int_{Hh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{2t/h}dt\\
&+\sum_{k=N-\lfloor H\rfloor}^{\lfloor H\rfloor-1}\int_{-kh}^{(N-1-k)h}0dt+\sum_{k=\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-kh}^{-Hh}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{-2t/h}dt\\
&+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{-2t/h}dt\\
=\ &-\frac{(N-1)({}^{m}W)^2({}^{m}w)^{2H}}{h\ln({}^{m}w)}. \qquad (112)
\end{aligned}
$$

(iii) $2\lfloor H\rfloor=N$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}_{*}\tilde{\psi}_0(t)-{}^{m}_{*}\psi_0(t)\right|^2dt\\
=\ &\sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h}\left|{}^{m}_{*}\psi_0(t)\right|^2dt+\sum_{k=-\lfloor H\rfloor+1}^{\lfloor H\rfloor-1}\int_{Hh}^{(N-1-k)h}\left|{}^{m}_{*}\psi_0(t)\right|^2dt\\
&+\sum_{k=N-\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-kh}^{-Hh}\left|{}^{m}_{*}\psi_0(t)\right|^2dt+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}_{*}\psi_0(t)\right|^2dt\\
\leq\ &\sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{2t/h}dt+\sum_{k=-\lfloor H\rfloor+1}^{\lfloor H\rfloor-1}\int_{Hh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{2t/h}dt\\
&+\sum_{k=N-\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-kh}^{Hh}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{-2t/h}dt+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}\frac{({}^{m}W)^2}{h^2}({}^{m}w)^{-2t/h}dt\\
=\ &-\frac{(N-1)({}^{m}W)^2({}^{m}w)^{2H}}{h\ln({}^{m}w)}. \qquad (113)
\end{aligned}
$$

(111),(112), そして (113) 式より，(72) 式が導かれる．**(Q.E.D)**

6.2 付録 B

((82) 式の証明)

(証明) 補助定理 1 における (30) 式より，(81) 式は次のように求められる：

(i) $2\lfloor H\rfloor \leq (N-1)$ の場合：

$$\begin{aligned}
&\sum_{k=-\infty}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}\tilde{\psi}_0(t)\right|^2 dt \\
&= \sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h} 0dt + \sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}\left|{}^{m}\psi_0(t)\right|^2 dt \\
&\quad + \sum_{k=1}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt + \int_{0}^{Hh}\left|{}^{m}\psi_0(t)\right|^2 dt\right\} \\
&\quad + \sum_{k=\lfloor H\rfloor}^{N-\lfloor H\rfloor-1}\left\{\int_{-Hh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt + \int_{0}^{Hh}\left|{}^{m}\psi_0(t)\right|^2 dt\right\} \\
&\quad + \sum_{k=N-\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt + \int_{0}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt\right\} \\
&\quad + \sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h} 0dt + \sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h} 0dt \\
&\leq \sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt \\
&\quad + \sum_{k=1}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt + \int_{0}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad + \sum_{k=\lfloor H\rfloor}^{N-\lfloor H\rfloor-1}\left\{\int_{-Hh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt + \int_{0}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad + \sum_{k=N-\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt + \int_{0}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&= -\frac{T({}^{m}U)^2\left\{1-({}^{m}u)^{2H}\right\}}{\ln({}^{m}u)}.
\end{aligned} \tag{114}$$

(ii) $(N+1)/2 \leq \lfloor H\rfloor \leq (N-2)$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty} \int_{-kh}^{(N-1-k)h} \left| {}^{m}\tilde{\psi}_0(t) \right|^2 dt \\
&= \sum_{k=-\infty}^{-\lfloor H \rfloor} \int_{-kh}^{(N-1-k)h} 0 dt + \sum_{k=-\lfloor H \rfloor+1}^{0} \int_{-kh}^{Hh} \left| {}^{m}\psi_0(t) \right|^2 dt \\
&\quad + \sum_{k=1}^{N-\lfloor H \rfloor-1} \left\{ \int_{-kh}^{0} \left| {}^{m}\psi_0(t) \right|^2 dt + \int_{0}^{Hh} \left| {}^{m}\psi_0(t) \right|^2 dt \right\} \\
&\quad + \sum_{k=N-\lfloor H \rfloor}^{\lfloor H \rfloor-1} \left\{ \int_{-kh}^{0} \left| {}^{m}\psi_0(t) \right|^2 dt + \int_{0}^{(N-1-k)h} \left| {}^{m}\psi_0(t) \right|^2 dt \right\} \\
&\quad + \sum_{k=\lfloor H \rfloor}^{N-1} \left\{ \int_{-Hh}^{0} \left| {}^{m}\psi_0(t) \right|^2 dt + \int_{0}^{(N-1-k)h} \left| {}^{m}\psi_0(t) \right|^2 dt \right\} \\
&\quad + \sum_{k=N}^{N+\lfloor H \rfloor-2} \int_{-Hh}^{(N-1-k)h} \left| {}^{m}\psi_0(t) \right|^2 dt + \sum_{k=N+\lfloor H \rfloor-1}^{\infty} \int_{-kh}^{(N-1-k)h} 0 dt \\
&\leq \sum_{k=-\lfloor H \rfloor+1}^{0} \int_{-kh}^{Hh} ({}^{m}U)^2 ({}^{m}u)^{2t/h} dt \\
&\quad + \sum_{k=1}^{N-\lfloor H \rfloor-1} \left\{ \int_{-kh}^{0} ({}^{m}U)^2 ({}^{m}u)^{-2t/h} dt + \int_{0}^{Hh} ({}^{m}U)^2 ({}^{m}u)^{2t/h} dt \right\} \\
&\quad + \sum_{k=N-\lfloor H \rfloor}^{\lfloor H \rfloor-1} \left\{ \int_{-kh}^{0} ({}^{m}U)^2 ({}^{m}u)^{-2t/h} dt + \int_{0}^{(N-1-k)h} ({}^{m}U)^2 ({}^{m}u)^{2t/h} dt \right\} \\
&\quad + \sum_{k=\lfloor H \rfloor}^{N-1} \left\{ \int_{-Hh}^{0} ({}^{m}U)^2 ({}^{m}u)^{-2t/h} dt + \int_{0}^{(N-1-k)h} ({}^{m}U)^2 ({}^{m}u)^{2t/h} dt \right\} \\
&\quad + \sum_{k=N}^{N+\lfloor H \rfloor-2} \int_{-Hh}^{(N-1-k)h} ({}^{m}U)^2 ({}^{m}u)^{-2t/h} dt \\
&= -\frac{T({}^{m}U)^2 \left\{ 1 - ({}^{m}u)^{2H} \right\}}{\ln({}^{m}u)}.
\end{aligned}
\tag{115}
$$

(iii) $\lfloor H \rfloor \geq (N+1)$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty} \int_{-kh}^{(N-1-k)h} \left| {}^{m}\tilde{\psi}_0(t) \right|^2 dt \\
&= \sum_{k=-\infty}^{-\lfloor H \rfloor} \int_{-kh}^{(N-1-k)h} 0 dt + \sum_{k=-\lfloor H \rfloor+1}^{N-\lfloor H \rfloor-1} \int_{-kh}^{Hh} \left| {}^{m}\psi_0(t) \right|^2 dt \\
&\quad + \sum_{k=N-\lfloor H \rfloor}^{0} \int_{-kh}^{(N-1-k)h} \left| {}^{m}\psi_0(t) \right|^2 dt
\end{aligned}
$$

$$
\begin{aligned}
&+\sum_{k=1}^{N-1}\left\{\int_{-kh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt+\int_{0}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt\right\}\\
&+\sum_{k=N}^{\lfloor H\rfloor-1}\int_{-kh}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt+\sum_{k=\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt\\
&+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}0dt\\
\le\;&\sum_{k=-\lfloor H\rfloor+1}^{N-\lfloor H\rfloor-1}\int_{-kh}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt\\
&+\sum_{k=N-\lfloor H\rfloor}^{0}\int_{-kh}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\\
&+\sum_{k=1}^{N-1}\left\{\int_{-kh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt+\int_{0}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\}\\
&+\sum_{k=N}^{\lfloor H\rfloor-1}\int_{-kh}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{-2t/h}dt\\
&+\sum_{k=\lfloor H\rfloor}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{-2t/h}dt\\
=\;&-\frac{T({}^{m}U)^2\left\{1-({}^{m}u)^{2H}\right\}}{\ln({}^{m}u)}.
\end{aligned}
\tag{116}
$$

(iv) $\lfloor H\rfloor=N/2$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}\widetilde{\psi}_0(t)\right|^2 dt\\
=\;&\sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h}0dt+\sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}\left|{}^{m}\psi_0(t)\right|^2 dt\\
&+\sum_{k=1}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt+\int_{0}^{Hh}\left|{}^{m}\psi_0(t)\right|^2 dt\right\}\\
&+\sum_{k=\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}\left|{}^{m}\psi_0(t)\right|^2 dt+\int_{0}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt\right\}\\
&+\sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2 dt\\
&+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}0dt
\end{aligned}
$$

$$
\begin{aligned}
&\le \sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt \\
&\quad+\sum_{k=1}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt+\int_{0}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad+\sum_{k=\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt+\int_{0}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad+\sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{-2t/h}dt \\
&= -\frac{T({}^{m}U)^2\left\{1-({}^{m}u)^{2H}\right\}}{\ln({}^{m}u)}. \qquad (117)
\end{aligned}
$$

(v) $\lfloor H\rfloor=N-1$ の場合：

$$
\begin{aligned}
&\sum_{k=-\infty}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^{m}\tilde{\psi}_0(t)\right|^2dt \\
&= \sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h}0dt+\sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}\left|{}^{m}\psi_0(t)\right|^2dt \\
&\quad+\sum_{k=N-\lfloor H\rfloor}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}\left|{}^{m}\psi_0(t)\right|^2dt+\int_{0}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2dt\right\} \\
&\quad+\sum_{k=\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}\left|{}^{m}\psi_0(t)\right|^2dt+\int_{0}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2dt\right\} \\
&\quad+\sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}\left|{}^{m}\psi_0(t)\right|^2dt \\
&\quad+\sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h}0dt \\
&\le \sum_{k=-\lfloor H\rfloor+1}^{0}\int_{-kh}^{Hh}({}^{m}U)^2({}^{m}u)^{2t/h}dt \\
&\quad+\sum_{k=N-\lfloor H\rfloor}^{\lfloor H\rfloor-1}\left\{\int_{-kh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt+\int_{0}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad+\sum_{k=\lfloor H\rfloor}^{N-1}\left\{\int_{-Hh}^{0}({}^{m}U)^2({}^{m}u)^{-2t/h}dt+\int_{0}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{2t/h}dt\right\} \\
&\quad+\sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}({}^{m}U)^2({}^{m}u)^{-2t/h}dt
\end{aligned}
$$

$$= -\frac{T({}^mU)^2\left\{1-({}^mu)^{2H}\right\}}{\ln({}^mu)}. \tag{118}$$

(vi) $\lfloor H \rfloor = N$ の場合：

$$\begin{aligned}
&\sum_{k=-\infty}^{\infty}\int_{-kh}^{(N-1-k)h}\left|{}^m\tilde{\psi}_0(t)\right|^2 dt \\
&= \sum_{k=-\infty}^{-\lfloor H\rfloor}\int_{-kh}^{(N-1-k)h} 0dt + \sum_{k=-\lfloor H\rfloor+1}^{N-\lfloor H\rfloor-1}\int_{-kh}^{Hh}\left|{}^m\psi_0(t)\right|^2 dt \\
&\quad + \sum_{k=N-\lfloor H\rfloor}^{0}\int_{-kh}^{(N-1-k)h}\left|{}^m\psi_0(t)\right|^2 dt \\
&\quad + \sum_{k=1}^{N-1}\left\{\int_{-kh}^{0}\left|{}^m\psi_0(t)\right|^2 dt + \int_{0}^{(N-1-k)h}\left|{}^m\psi_0(t)\right|^2 dt\right\} \\
&\quad + \sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}\left|{}^m\psi_0(t)\right|^2 dt \\
&\quad + \sum_{k=N+\lfloor H\rfloor-1}^{\infty}\int_{-kh}^{(N-1-k)h} 0dt \\
&\leq \sum_{k=-\lfloor H\rfloor+1}^{N-\lfloor H\rfloor-1}\int_{-kh}^{Hh}({}^mU)^2({}^mu)^{2t/h}dt \\
&\quad + \sum_{k=N-\lfloor H\rfloor}^{0}\int_{-kh}^{(N-1-k)h}({}^mU)^2({}^mu)^{2t/h}dt \\
&\quad + \sum_{k=1}^{N-1}\left\{\int_{-kh}^{0}({}^mU)^2({}^mu)^{-2t/h}dt + \int_{0}^{(N-1-k)h}({}^mU)^2({}^mu)^{2t/h}dt\right\} \\
&\quad + \sum_{k=N}^{N+\lfloor H\rfloor-2}\int_{-Hh}^{(N-1-k)h}({}^mU)^2({}^mu)^{-2t/h}dt \\
&= -\frac{T({}^mU)^2\left\{1-({}^mu)^{2H}\right\}}{\ln({}^mu)}.
\end{aligned} \tag{119}$$

よって (114) から (119) 式より (82) 式が導かれる．**(Q.E.D)**

6.3 付録 C

((85) 式の証明)

(証明) 付録 A における ${}^{m}_{*}\tilde{\psi}_0(t)$,${}^{m}_{*}\psi_0(t)$,$\frac{({}^{m}W)^2}{h^2}$, そして $({}^{m}w)$ を ${}^{m}\tilde{\psi}_0(t)$,${}^{m}\psi(t)$,$({}^{m}U)^2$，そして $({}^{m}u)$ でそれぞれ置きかえることで (84) 式が得られる．さらに $T=(N-1)h$ を (84) に適用すると (85) 式が導出される．