Fall 08.

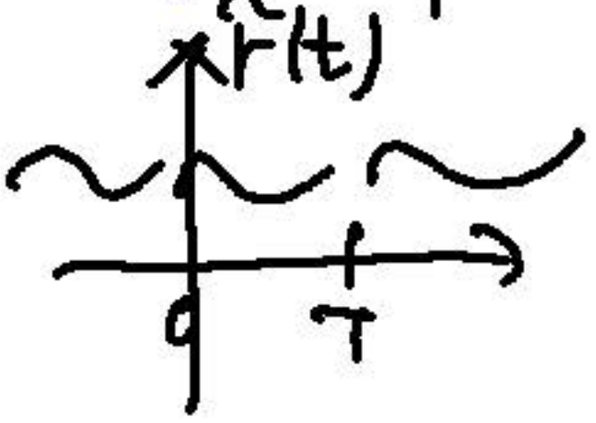
Problem 8

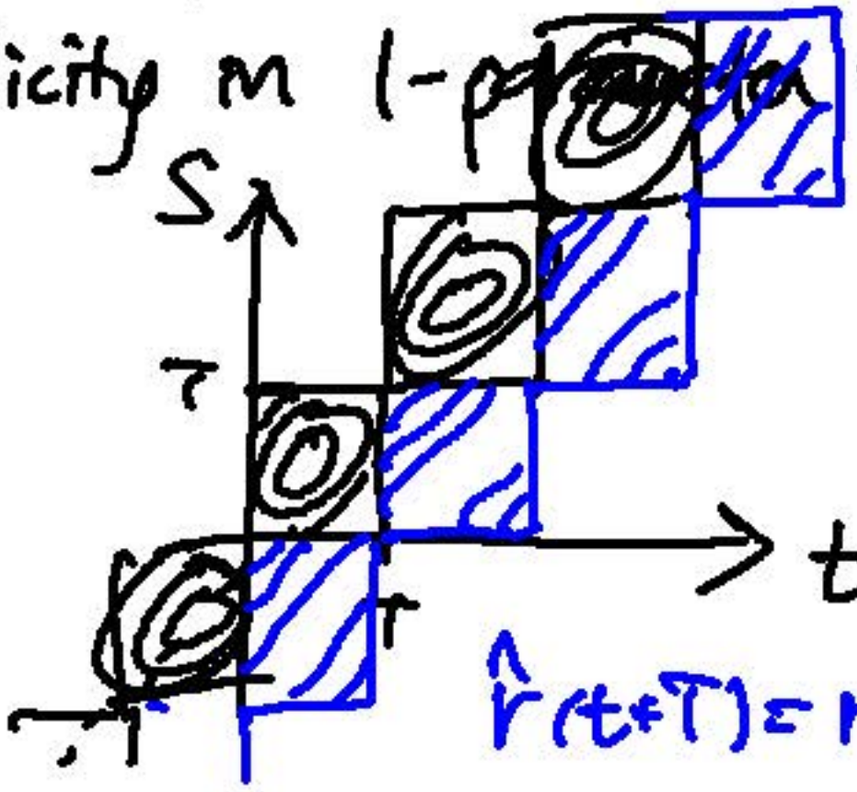
$r(t,s) = r(t+mT, s+mT), \forall m \in \mathbb{Z}$

Let me consider a simpler case that I already know.

$\tilde{r}(t) = r(t+mT), \forall m.$

This is periodicity in 1-parameter function.





$\hat{r}(t) = r(t,t)$

1. $\sqrt{2}T$
2. T

$\hat{r}(t)$

$\hat{r}(t+T) = r(t+T, t+T) = r(t,t)$

$$r(t,t-t') = \sum_{k=-\infty}^{\infty} r^{(k)}(t') \, e^{j\frac{2\pi k t}{T}} =$$

$$\Rightarrow r(t,s) = \sum_{k=-\infty}^{\infty} r^{(k)}(t-s) \, e^{j\frac{2\pi k t}{T}}$$

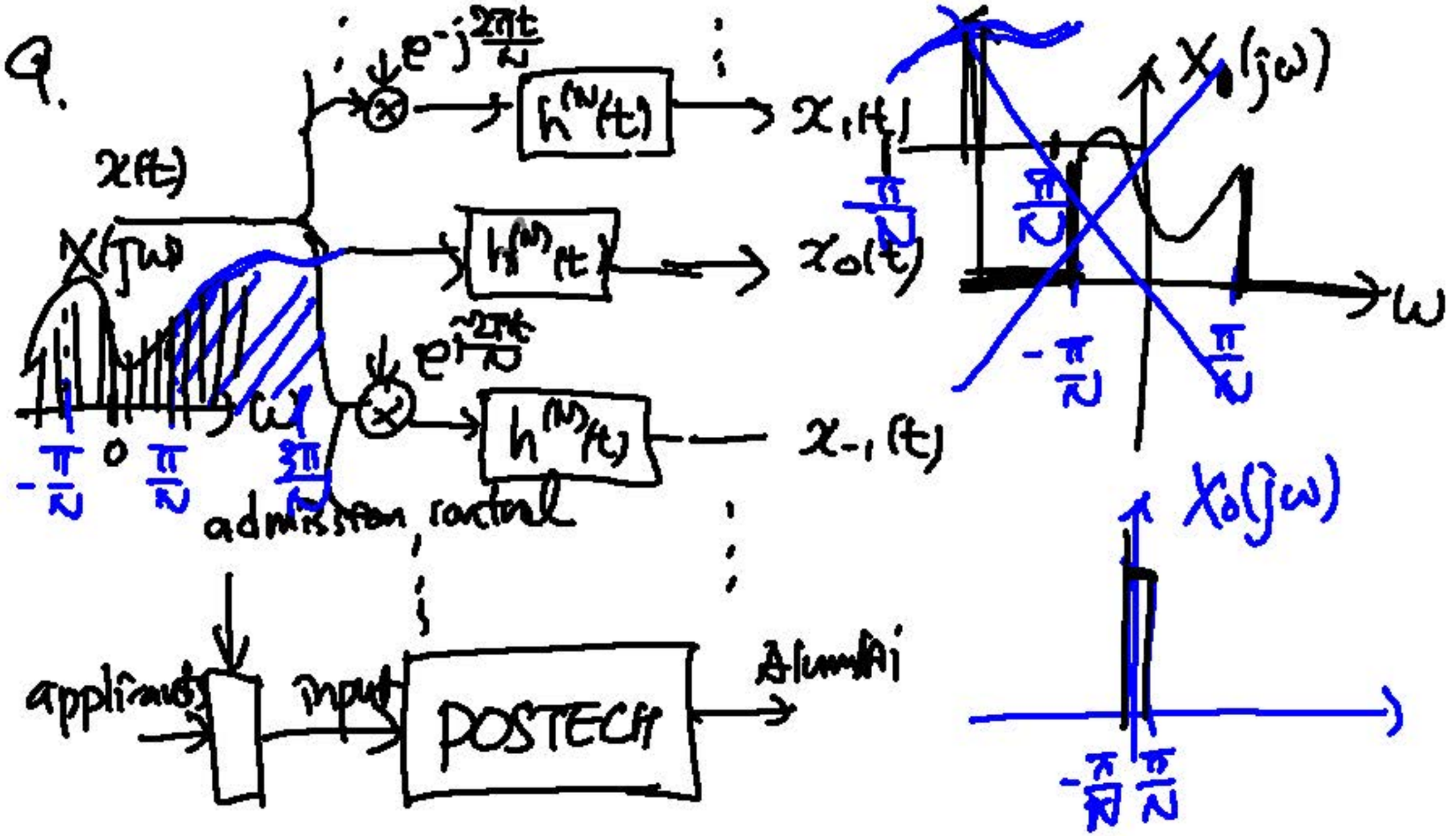
$s = t - t'$

$t' = t - s$

$$R_1(j\omega) = \int_{-\infty}^{\infty} r(t,s) \, e^{-j\omega t} \, dt$$

$$= \int_{-\infty}^{\infty} \left(\sum_{k=-\infty}^{\infty} r^{(k)}(t-s) \, e^{j\frac{2\pi k t}{T}} \right) e^{-j\omega t} \, dt$$

9.


x(t)
X(jω)
$e^{-j\frac{2\pi t}{N}}$
$h^{(N)}(t)$
$x_1(t)$
$h^{(N)}(t)$
$x_0(t)$
$e^{j\frac{2\pi t}{N}}$
$h^{(N)}(t)$
$x_{-1}(t)$
$-\frac{\pi}{N}$
0
$\frac{\pi}{N}$
$\frac{2\pi}{N}$
ω
admission, rectoral
applicants
input
POSTECH
Alumni
$X_0(j\omega)$
$-\frac{\pi}{N}$
$\frac{\pi}{N}$

Midterm #2

1. T/F 10
2. Greek letters. upper & lower 21
3. Quiz problem.
4. (a) Def. of LPF, BPF, HPF, etc.
   (b) Dirichlet conditions
   (c) Gibbs' phenomenon
   (d) $\left(\sum_{k=-\infty}^{\infty} a_k\right)^2 = \sum_{k=-\infty}^{\infty} a_k \sum_{k'=-\infty}^{\infty} a_{k'}$

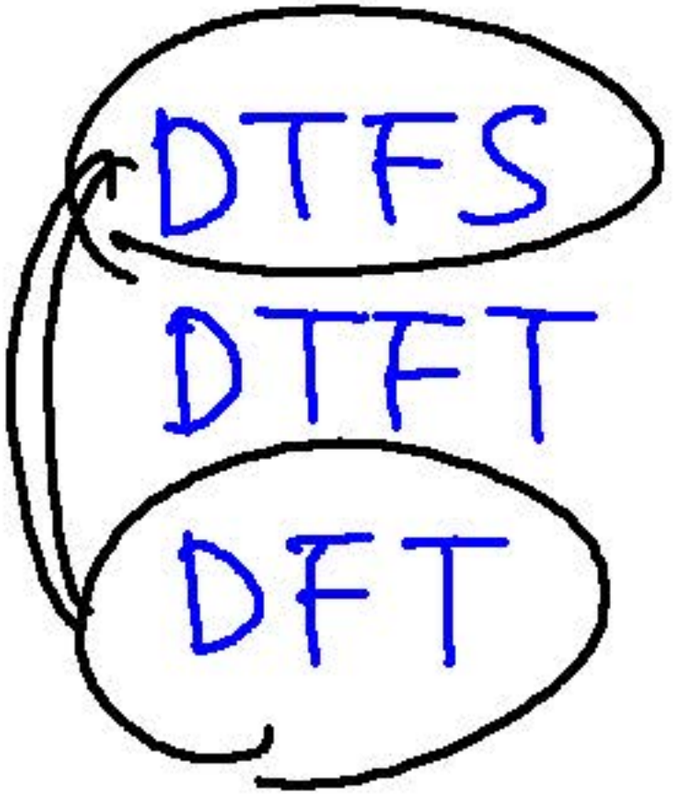
5. Combination of DTFS & CTFT

$a \neq 0 \quad \delta(at) \stackrel{?}{=} \frac{1}{|a|}\delta(t)$

6. Taylor series expansion

Taylor meets Fourier.

7. DTFT related questions


DTFS
DTFT
DFT