Linq

$$select(v, \grave{}) := \left\| \begin{array}{l} len \leftarrow \text{length}(v) \\ \text{for } n \in 0..len-1 \\ \quad \left\| out_n \leftarrow \grave{}(v_n) \right. \\ out \end{array} \right.$$

$$r2(b,e) := \left\| \begin{array}{l} \text{if } b > e \\ \quad \left\| \text{return } 0 \right. \\ k \leftarrow 0 \\ \text{for } n \in b..e \\ \quad \left\| \begin{array}{l} out_k \leftarrow b+k \\ k \leftarrow k+1 \end{array} \right. \\ out \end{array} \right.$$

$$select2(v, \grave{}) := \left\| \begin{array}{l} len \leftarrow \text{length}(v) \\ \text{for } n \in 0..len-1 \\ \quad \left\| out_n \leftarrow \grave{}(v_n, n) \right. \\ out \end{array} \right.$$

$$foreach(v, \grave{}) := select(v, \grave{})$$

$$selectmany(v, \grave{}) := \left\| \begin{array}{l} len \leftarrow \text{length}(v) \\ out \leftarrow 0 \\ \text{for } n \in 0..len-1 \\ \quad \left\| \begin{array}{l} tmp \leftarrow \grave{}(v_n) \\ \text{if IsArray}(out) \\ \quad \left\| out \leftarrow \text{stack}(out, tmp) \right. \\ \text{else} \\ \quad \left\| out \leftarrow tmp \right. \end{array} \right. \\ out \end{array} \right.$$

$$repeat(t,c) := \left\| \begin{array}{l} \text{for } n \in 0..c-1 \\ \quad \left\| out_n \leftarrow t \right. \\ out \end{array} \right.$$

$$where(v, \grave{}) := \left\| \begin{array}{l} len \leftarrow \text{length}(v) \\ [k \ n] \leftarrow [0 \ 0] \\ out \leftarrow 0 \\ \text{while } n < len \\ \quad \left\| \begin{array}{l} \text{if } \grave{}(v_n) \\ \quad \left\| \begin{array}{l} out_k \leftarrow v_n \\ k \leftarrow k+1 \end{array} \right. \\ n \leftarrow n+1 \end{array} \right. \\ out \end{array} \right.$$

$$where2(v, \grave{}) := \left\| \begin{array}{l} len \leftarrow \text{length}(v) \\ [k \ n] \leftarrow [0 \ 0] \\ out \leftarrow 0 \\ \text{while } n < len \\ \quad \left\| \begin{array}{l} \text{if } \grave{}(v_n, n) \\ \quad \left\| \begin{array}{l} out_k \leftarrow v_n \\ k \leftarrow k+1 \end{array} \right. \\ n \leftarrow n+1 \end{array} \right. \\ out \end{array} \right.$$

$$v := r2(0, 10)$$

$$where(v, \grave{}(x) \leftarrow x < 4)^T = [0 \ 1 \ 2 \ 3]$$

$$\left\| \begin{array}{l} \grave{} \leftarrow where(v, \grave{}(x) \leftarrow x > 5) \\ selectmany(select2(\grave{}, \grave{}(x,n) \leftarrow [n \ x]), \grave{}(x) \leftarrow x) \end{array} \right. = \begin{bmatrix} 0 & 6 \\ 1 & 7 \\ 2 & 8 \\ 3 & 9 \\ 4 & 10 \end{bmatrix}$$
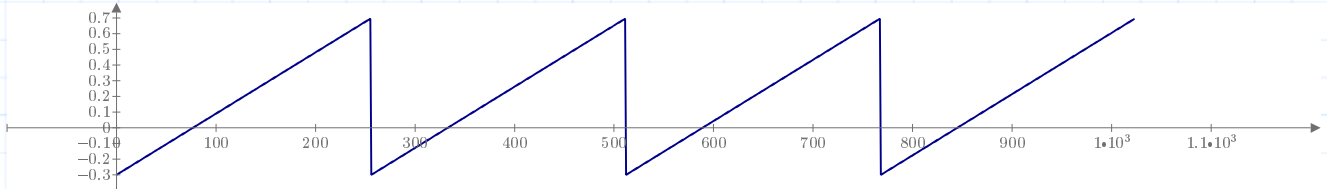
$$repeat(2,3)^T = [2 \ 2 \ 2]$$

TODO:
join(5), aggregate(2), aggregate(3), take(2), takewhile(2), takewhile2(2), skip(2), first(2), any(2), all(2), contains(2), count(2), batch(2), batch(3), exclude(3), takeevery(2).

$$dt:=1 \qquad N:=2^{10} \qquad T:=N\cdot dt \qquad Uo:=1 \qquad df:=\frac{1}{N\cdot dt}$$

$$u1:=foreach\left(r2\left(0,\frac{N}{4}-1\right),`(n)\leftarrow\frac{4\cdot n}{N}-\frac{Uo}{2}+0.2\right)$$

$$u:=selectmany\left(repeat\left(u1,4\right),`(x)\leftarrow x\right)$$

$$U:=augment\left(foreach\left(r2\left(0,N-1\right),`(n)\leftarrow n\cdot dt\right),u\right)$$

$$U^{\langle1\rangle}$$

$$U^{\langle0\rangle}$$

$$S:=\text{dft}\left(u\right) \qquad G:=augment\left(foreach\left(r2\left(0,N-1\right),`(n)\leftarrow n\cdot df\right),\frac{2}{N}\cdot\overrightarrow{|S|}\right)$$
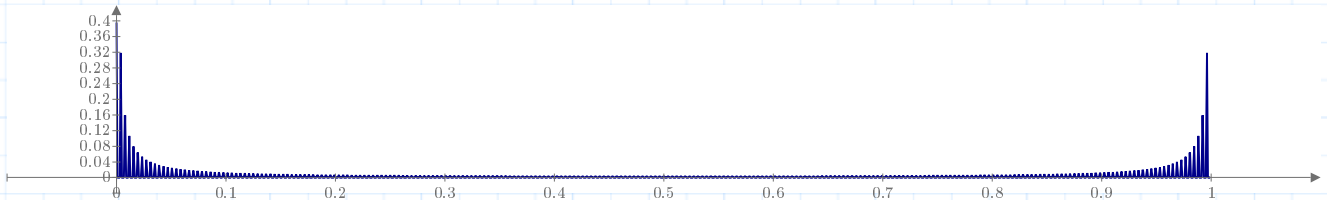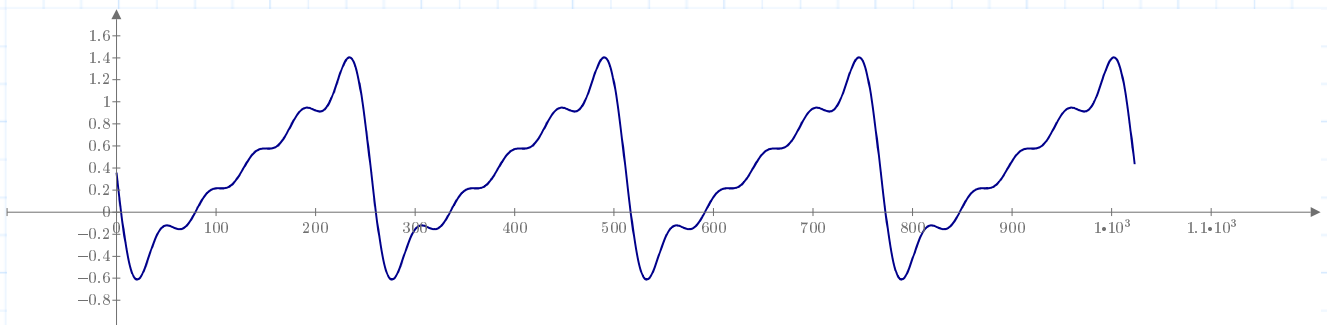

$$G^{\langle1\rangle}$$

$$G^{\langle0\rangle}$$

$$w1:=\frac{2\cdot\pi}{N} \qquad a:=2\cdot\text{Re}\left(\frac{2}{N}\cdot S\right) \qquad b:=-2\cdot\text{Im}\left(\frac{2}{N}\cdot S\right)$$

$$u\left(t,n\right):=\left\|\begin{array}{l}c\leftarrow foreach\left(r2\left(0,n\right),`(k)\leftarrow a_{k}\cdot\cos\left(k\cdot w1\cdot t\right)\right)\\ s\leftarrow foreach\left(r2\left(0,n\right),`(k)\leftarrow b_{k}\cdot\sin\left(k\cdot w1\cdot t\right)\right)\\ \frac{a_{0}}{2}+\sum foreach\left(r2\left(1,n\right),`(k)\leftarrow c_{k}+s_{k}\right)\end{array}\right.$$

$$t:=0,dt..\left(N-1\right)\cdot dt$$

$$u\left(t,20\right)$$

$$t$$