

Idea (1A)

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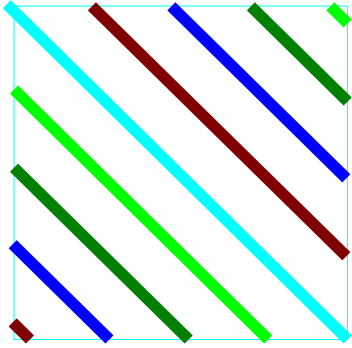
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Circulant Matrix



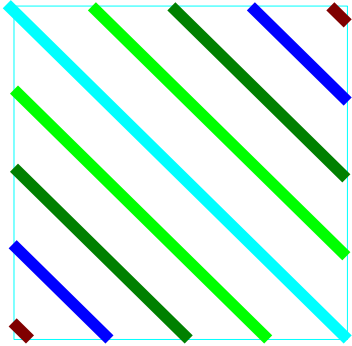
Cyclic(x) \rightarrow Cyclic(Kx) data redistribution problem

Destination Processor Table

$$(i * j) \bmod N$$

Log N steps

DFT Matrix



$$e^{-j\left(\frac{2\pi}{N}\right)kn} \in \left\{ e^{-j\left(\frac{2\pi}{N}\right)\cdot 0}, e^{-j\left(\frac{2\pi}{N}\right)\cdot 1}, e^{-j\left(\frac{2\pi}{N}\right)\cdot 2}, \dots, e^{-j\left(\frac{2\pi}{N}\right)(N-1)} \right\}$$

(i + j) mod N

Log N steps

Butterfly Computation

Data Redistribution Algorithm

Explore possible Log steps
in various cases of data redistributions
using artificial intelligence techniques -

Expert System
Prolog or Java based

References

- [1] <http://en.wikipedia.org/>
- [2] J.H. McClellan, et al., Signal Processing First, Pearson Prentice Hall, 2003
- [3] A "graphical interpretation" of the DFT and FFT, by Steve Mann