Positive Semi-Definite Kernel Proof

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In [2]:
```
import argparse
import numpy as np
from tqdm import tqdm

def run(n, d, iterations):
    """Apply the specified kernel on an certain amount of time series
    of a certain length for a certain amount of iterations
    n - Amount of time series
    d - Length of time series
    iterations - Iterations that should be performed
    """

    for _ in tqdm(range(iterations)):
        X = np.random.rand(d, n)
        c = np.random.rand(n)

        sum_ = 0
        for i in range(n):
            for j in range(n):
                convolution = np.convolve(X[i, :], X[j, :], 'same')
                squared_norm = np.square(np.linalg.norm(convolution))
                squared_norm *= c[i] * c[j]
                sum_ += squared_norm
        if sum_ < 0:
            print("Kernel value is non-positive")
            return

    print("Could not find non-positive kernel value")

run(100, 100, 100)
```

```
100%|| 100/100 [00:22<00:00,  4.45it/s]

Could not find non-positive kernel value
```

In [ ]: