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% Taha Akhlaq MATLAB Assignment 2: Vectorization

clc; % clear command window

% Question 1

u = (-5 : 3 : 7) % 1

v = (-pi : pi/4 : pi)' % 2

% Question 2

n_q2 = prod(1:10)

% Question 3

% Part 1
A = zeros(5,5); % 5x5 Matrix

% Insert 1s
A(1,1) = 1;
A(2,2) = 1;
A(4,4) = 1;
A(5,4) = 1;
A(5,5) = 1;

A % Display the Matrix

% Part 2
B_left = reshape( [12, 11, 10, 6, 5, 4], [3, 2] ); % Create Left Side of B
B_right = B_left - 3; % Create Right Side of B
B = [B_left, B_right] % Conjoin the Two Sides

% Question 4

%i
t = linspace (-pi, pi, 1000);

%ii
n = (0:50)';
a_n = (2*n + 1);

%iii
terms = (sin(a_n * t) ./ a_n);

%iv
s = sum(terms, 1);
```

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%v
plot(t, s)
grid on;
xlabel('Time (t)');
ylabel('Square Wave Approximation');
title('Square Wave Approximation Using Fourier Series');

```

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% Output:

```

```

u =

```

```

    -5    -2     1     4     7

```

```

v =

```

```

-3.1416
-2.3562
-1.5708
-0.7854
     0
 0.7854
 1.5708
 2.3562
 3.1416

```

```

n_q2 =

```

```

    3628800

```

```

A =

```

```

     1     0     0     0     0
     0     1     0     0     0
     0     0     0     0     0
     0     0     0     1     0
     0     0     0     1     1

```

```

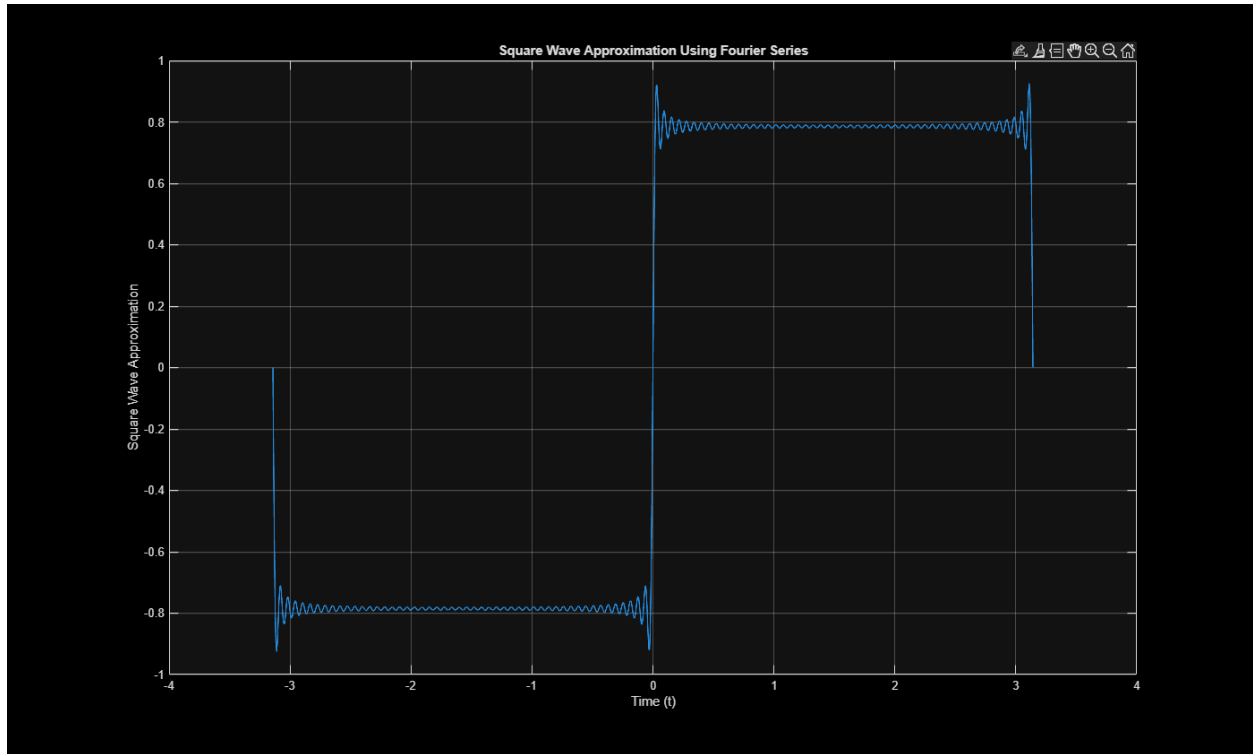
B =

```

```

    12     6     9     3
    11     5     8     2
    10     4     7     1

```



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