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# Arithmetic series example

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This is an example to implement an arithmetic series in Matlab code. This example was developed during the summer school 2017 for Jade University in Wilhelmshaven by Gerardo M. Chavez-Campos, for more information visit [sagitario.itmorelia.edu.mx/gmarx/summerJade](http://sagitario.itmorelia.edu.mx/gmarx/summerJade).

## Sequence and series definition

A **Sequence** is a list of things (usually numbers) that are in order. A sequence is usually defined by a **Rule**, this is a way or equation to find each term [1]. Thus, in order to be able of determine ( $u_n$ ,  $n$ th term) the **Rule** is written as a formula, where  $n$  is any term.

Now lets find a way to determine automatically each term ( $u_n$ ) for the next sequence: 3, 5, 7, 9, ... and so forth,

```
for n=1:5
    u=2*n+1
end
```

u =

3

u =

5

u =

7

u =

9

u =

11

## Finite series

Now let  $u_n$  be a sequence. Then the finite sum  $S_n$  (partial sum) of  $n$  order is:

$$S_n = u_1 + u_2 + u_3 + \dots + u_n,$$

and can be implemented in matlab as shown below.

```
for n=1:5
    Un(n)=2*n+1;
end
Sum=sum(Un)
```

```
Sum =

    35
```

Another way to calculate  $S_n$  is with the following code:

```
Sum=0;
for n=1:5
    Un=2*n+1;
    Sum=Un+Sum
end
```

```
Sum =

     3
```

```
Sum =

     8
```

```
Sum =

    15
```

```
Sum =

    24
```

```
Sum =

    35
```

## Infinite series

```
% Let  $\{u_n\}$  be a sequence. Then the Infinite sum order is:  
%  
%  $\sum_{n=1}^{\infty} u_n = u_1 + u_2 + u_3 + \dots$  %
```

## References

1. [1] Math is Fun [www.mathisfun.com](http://www.mathisfun.com)
2. [sagitario.itmorelia.edu.mx/gmarx/summerJade](http://sagitario.itmorelia.edu.mx/gmarx/summerJade)

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