

Periodic Functions

We say $f(x)$ is periodic with period m if $f(x)=f(x+m)$ for all x .
 Usually we are given a formula for f on a single period $[a,b)$ with $b-a=m$.
 To find $f(x)$ for x not in $[a,b)$ we first find the greatest integer multiple of m less than or equal to $x-a$,

$$z=m*\text{floor}((x-a)/m)$$

(Here $\text{floor}(t)$ is the MATLAB function giving the greatest integer $\leq t$.)
 Now $y=x-z$ is in $[a,b)$. The point is that $f(y)=f(x)$ and we have a formula for $f(y)$.

example

Let $f(x)=\text{abs}(x)$ for $-3 \leq x < 3$ and assume $f(x)$ is $3-(-3)=6$ -periodic.
 To write a M-file for f type :

```
*****
function w=f(x)
z=6*floor((x+3)/6);
y=x-z;
w=abs(y);
*****
```

ASSIGNMENT 3 :

1. Let
 $f(x)=x^2$ if $-2 \leq x < 2$
 and $f(x)$ is 4-periodic.
 Write $f.m$ and graph $f(x)$ on $[-10,10]$.

2. Let
 $g(x)=x$ if $-2 \leq x < 2$
 and $g(x)$ is 4-periodic .
 Write $g.m$ and graph $g(x)$ on $[-10,10]$.