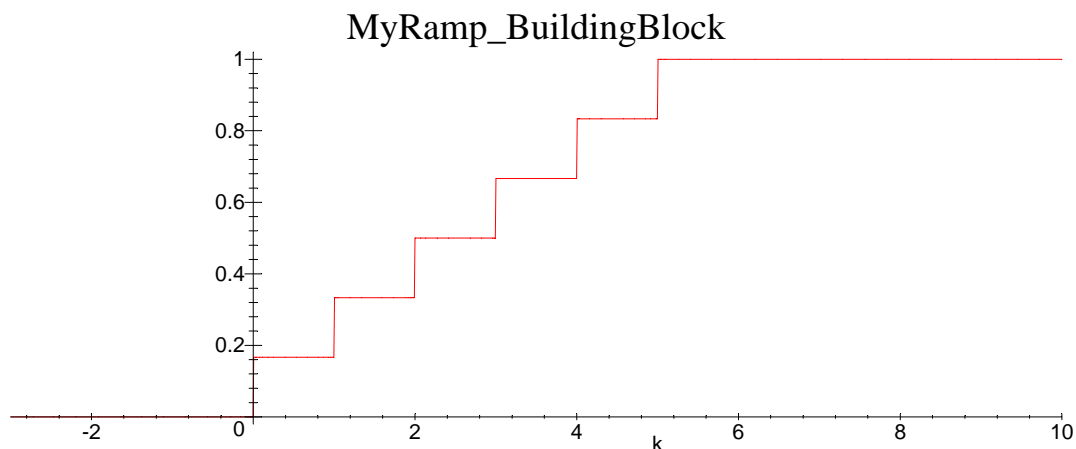


```

STUDENT > # Build mmf profile associated with stator current and
           analyse harmonics
STUDENT > # k = slot number 0..89
STUDENT > # Profile1 = mmf from bottom coils
STUDENT > # Profile2 = mmf from top coils (inverted and shifted by 7
           from Profile1)
STUDENT > # Adding together these two profiles accounts for both
           pitch and distribution factors
STUDENT > # Assume slot width is negligible and mmf change occurs as
           a step change (typical assumption)
STUDENT > # MyRamp = building block for Profile1 and Profile2
STUDENT > restart;
STUDENT > pi:=evalf(Pi):
STUDENT > MyRamp(k):=(Heaviside(k-j)+Heaviside(k-1-j)+Heaviside(k-2-
           j)+Heaviside(k-3-j)+Heaviside(k-4-j)+Heaviside(k-5-j))/6;

MyRamp(k) :=  $\frac{1}{6}$  Heaviside(k - j) +  $\frac{1}{6}$  Heaviside(k - 1 - j) +  $\frac{1}{6}$  Heaviside(k - 2 - j)
           +  $\frac{1}{6}$  Heaviside(k - 3 - j) +  $\frac{1}{6}$  Heaviside(k - 4 - j) +  $\frac{1}{6}$  Heaviside(k - 5 - j)
STUDENT > plot(subs(j=0,MyRamp(k)),k=-3..10,title='MyRamp_BuildingBl
           ock');

```

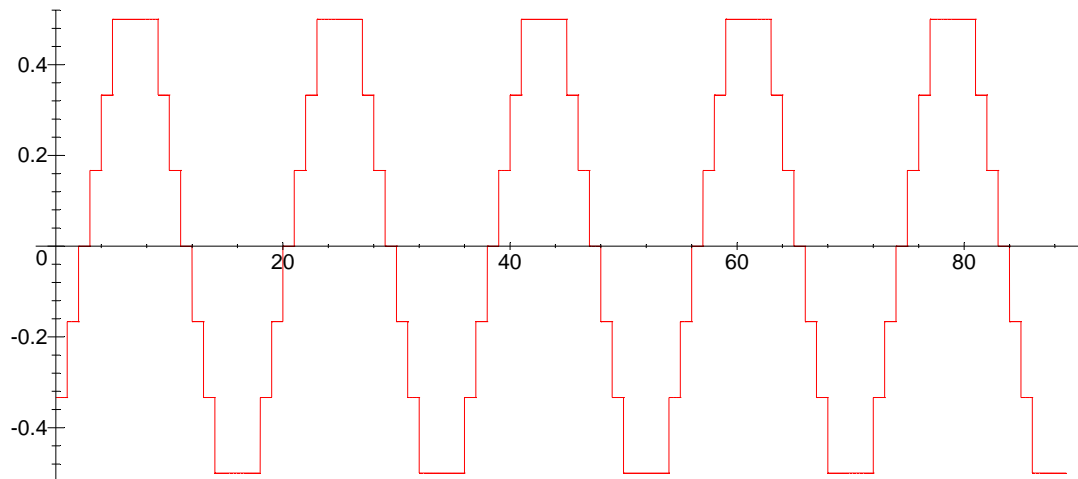


```

STUDENT >
STUDENT > Profile1:=subs(j=0,MyRamp(k))-subs(j=9,MyRamp(k))+subs(j=1
           8,MyRamp(k))-subs(j=27,MyRamp(k))+subs(j=36,MyRamp(k))-sub
           s(j=45,MyRamp(k))+subs(j=54,MyRamp(k))-subs(j=63,MyRamp(k)
           )+subs(j=72,MyRamp(k))-subs(j=81,MyRamp(k))+subs(j=90,MyRa
           mp(k))-0.5:
STUDENT > plot(Profile1,k=0..89,title='mmf_Profile1_Of_Bottom_Coil_S
           ides',numpoints=1000);

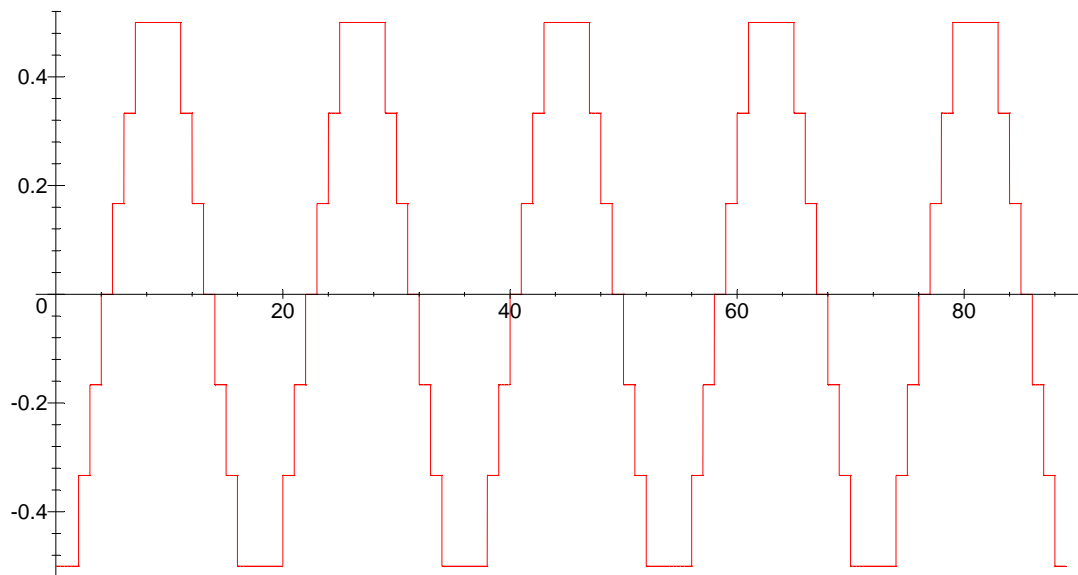
```

mmf_Profile1_Of_Bottom_Coil_Sides

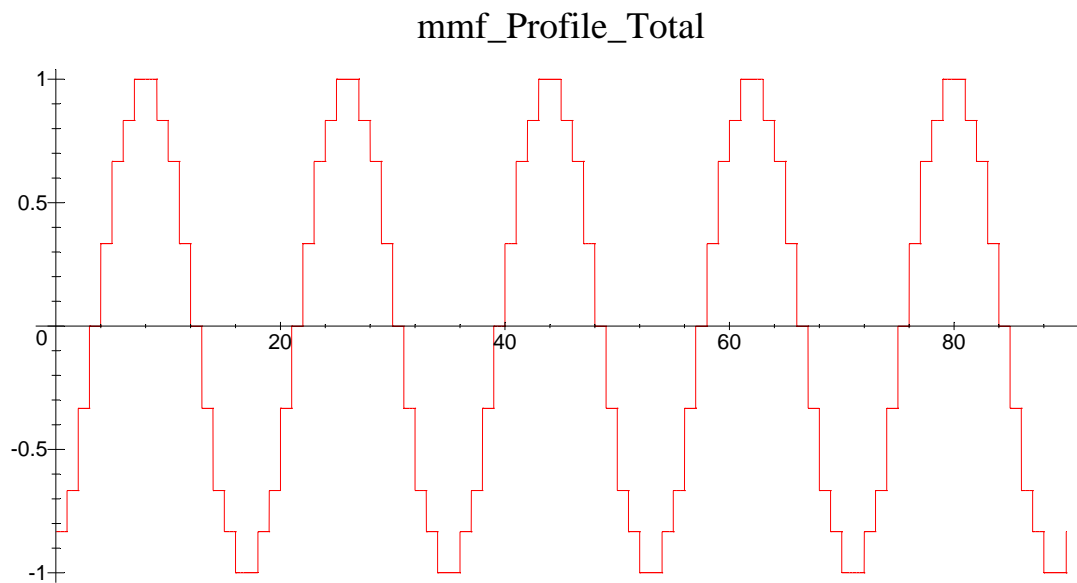


```
STUDENT > Profile2:=-1*subs(k=k+7,Profile1):
STUDENT > plot(Profile2,k=0..89,title='mmf_Profile2_Of_Top_Coil_Sides',numpoints=1000);
```

mmf_Profile2_Of_Top_Coil_Sides



```
STUDENT > ProfileTot:=Profile1+Profile2:
STUDENT > plot(ProfileTot,k=0..90,title='mmf_Profile_Total',numpoints=1000);
```



```
STUDENT > # Perform Spatial Fourier Analysis of this total waveform.
           Fundamental wave period is 18 slots
```

```
STUDENT > A1a:=int(cos(2*pi*1*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A1b:=int(sin(2*pi*1*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A1:=2*sqrt(A1a^2+A1b^2)/90;
```

$A1 := .9727345828$

```
STUDENT >
```

```
STUDENT > A3a:=int(cos(2*pi*3*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A3b:=int(sin(2*pi*3*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A3:=2*sqrt(A3a^2+A3b^2)/90;
```

```
STUDENT >
```

$A3 := .02122065950$

```
STUDENT > A5a:=int(cos(2*pi*5*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A5b:=int(sin(2*pi*5*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A5:=2*sqrt(A5a^2+A5b^2)/90;
```

```
STUDENT >
```

$A5 := .01552431963$

```
STUDENT > A7a:=int(cos(2*pi*7*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A7b:=int(sin(2*pi*7*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A7:=2*sqrt(A7a^2+A7b^2)/90;
```

```
STUDENT >
```

$A7 := .02236000840$

```
STUDENT > A9a:=int(cos(2*pi*9*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A9b:=int(sin(2*pi*9*k/18)*ProfileTot,k=0..89):
```

```
STUDENT > A9:=2*sqrt(A9a^2+A9b^2)/90;
```

```
STUDENT >
```

$A9 := .4710605$

