Produzindo gráficos com o MATLAB

Métodos Numéricos

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Comando básico “plot(.)”:

- Exemplo:

```
>> clear
>> x = -pi:pi/10:pi;
>> y = tan(sin(x)) - sin(tan(x));
>> plot(x,y)
>> grid
>>
```

Gráficos no MATLAB: plot()

- Tipos de estilos de linha, cores e marcadores:

Color	Line Style	Marker
y (yellow)	**-** (solid)	**.** (point)
m (magenta)	**:** (dotted)	**o** (circle)
c (cyan)	**-.** (dashdot)	**x** (x-mark)
r (red)	**--** (dashed)	**+** (plus)
g (green)		***** (star)
b (blue)		**s** (square)
w (white)		**d** (diamond)
k (black)		**h** (hexagram)
		p (pentagram)
		v (triangle down)
		> (triangle right)
		< (triangle left)
		^ (triangle up)

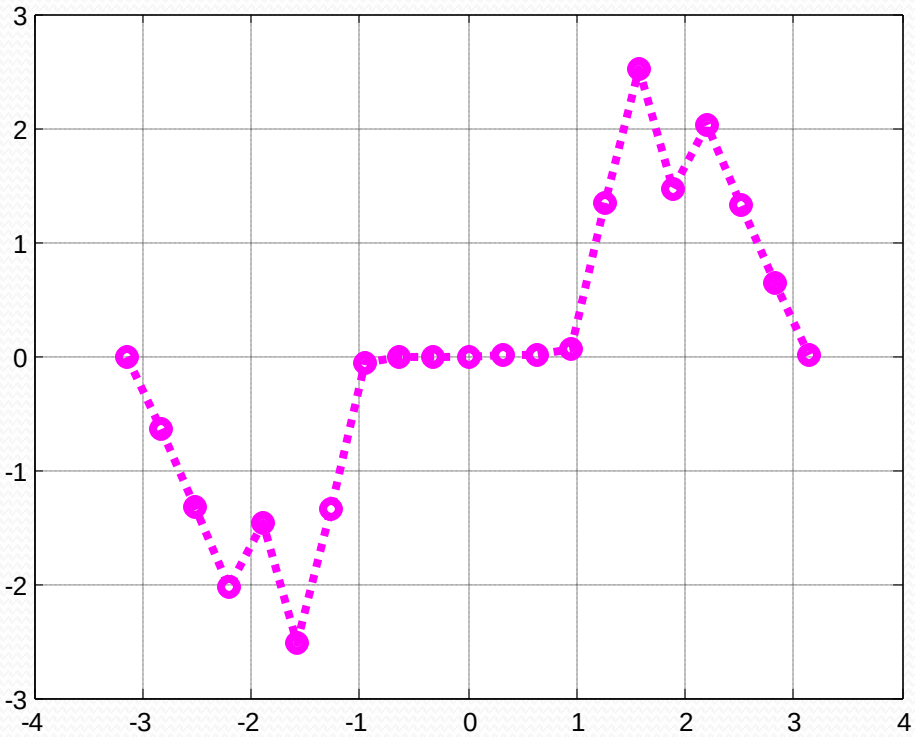
- Exemplo:

```
>> plot(t, xr, 'g:')
```

Opções “plot(x,y,'opções')”:

- Exemplo:

```
>> plot(x,y,'mo:')
>> grid
>>
```



b	blue
g	green
r	red
c	cyan
m	magenta
y	yellow
k	black
w	white

.	point
o	circle
x	x-mark
+	plus
*	star
s	square
d	diamond
v	triangle (down)
^	triangle (up)
<	triangle (left)
>	triangle (right)
p	pentagram
h	hexagram

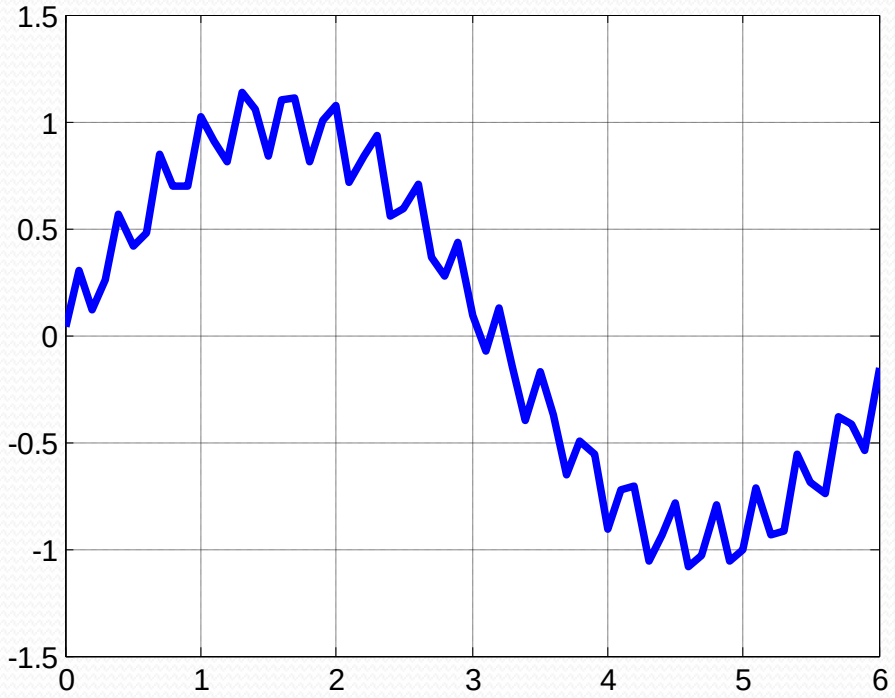
-	solid
:	dotted
-.	dashdot
--	dashed
(none)	no line

Exemplo_2)

- Gerando outro vetor de teste:

```
>> x = [0:0.1:6];
>> y = sin(x)+0.175*sin(20*x)+0.05*rand(size(x));
>> plot(x,y)
```

- Gráfico gerado:

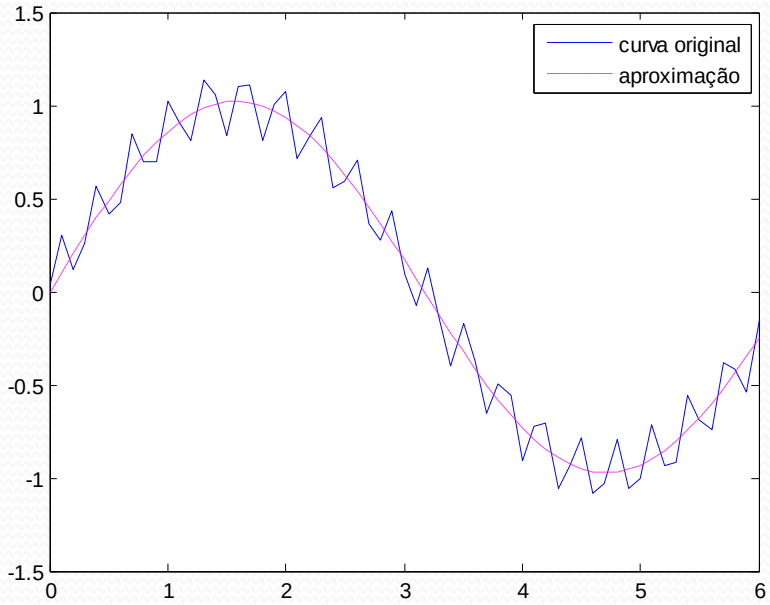


Plotando 2 funções ao mesmo tempo:

- Exemplo: seno(x) e cosseno(x), $-\pi < x < \pi$

- Dica:

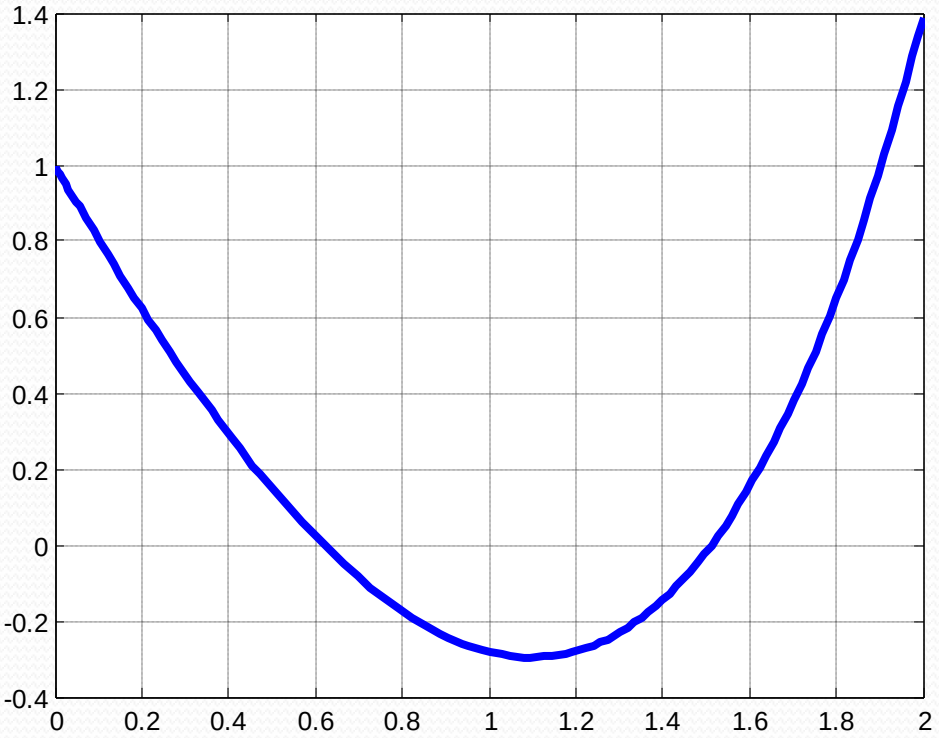
```
>> y6=fun_teste(p6,x);
>> figure; plot(x,y,'b',x,y6,'m--')
>> legend('curva original', 'aproximação')
```



Função “fplot(.)”:

- Exemplo:

```
>> fplot(@(x)funcao(x),[0,2])
>> grid
>>
```



Exemplo: Série de Taylor:

- Seno: $x \approx x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \approx \sum_{n=0}^{\infty} \frac{x^{(2n+1)}}{(2n+1)!}$

```
x=[-2*pi:0.05:2*pi];
[linhas colunas]=size(x);
% síntese com n até 4 termos, iniciando de f(0)
% gerando vetor y(n,ponto)
for i=1:colunas
    y(1,i)=x(i); % reta
    y(2,i)=y(1,i)-(x(i)^3)/factorial(3); % pol. 3a-ordem
    y(3,i)=y(2,i)+(x(i)^5)/factorial(5); % pol. 5a-ordem
    y(4,i)=y(3,i)-(x(i)^7)/factorial(7); % pol. 7a-ordem
    y(5,i)=sin(x(i)); % seno sem aproximação
end
plot(x,y(5,:),'k', x,y(1,:),'g:', x,y(2,:),'r-.', x,y(3,:),'b--', x,y(4,:),'m:')
axis([-pi pi -1.2 1.2])
legend ('sin(x)','reta','3^a ordem','5^a ordem', '7^a ordem')
grid
```