Bond Pricing(Matlab Code)

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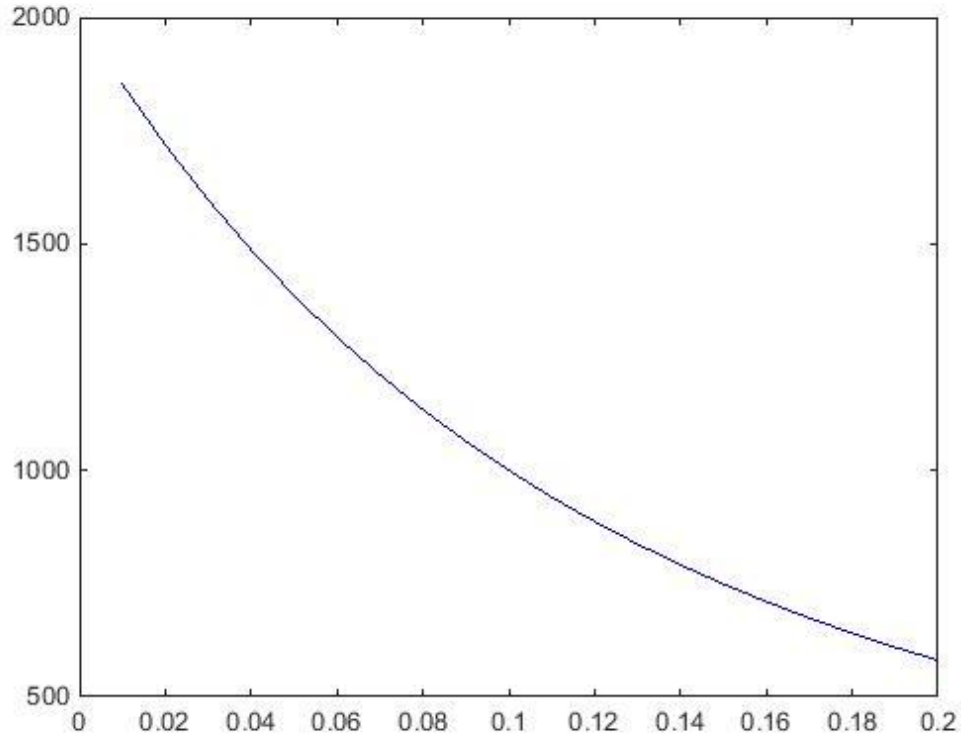
syms p c y f t %p 是价格，c 是每期利息金额，y 是到期收益率，f 是面值，t 是债券期限。
p=c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t;
%原理 1 p 与 y 成反比
% c = 100;
% f = 1000;
% t = 10;
% y = 0.01:0.01:0.2;
%%fun=p
% fun = @(y)c.*(1./y-1./(y.*(1+y).^t))+f./(1+y).^t;
% plot(y,fun(y));
```

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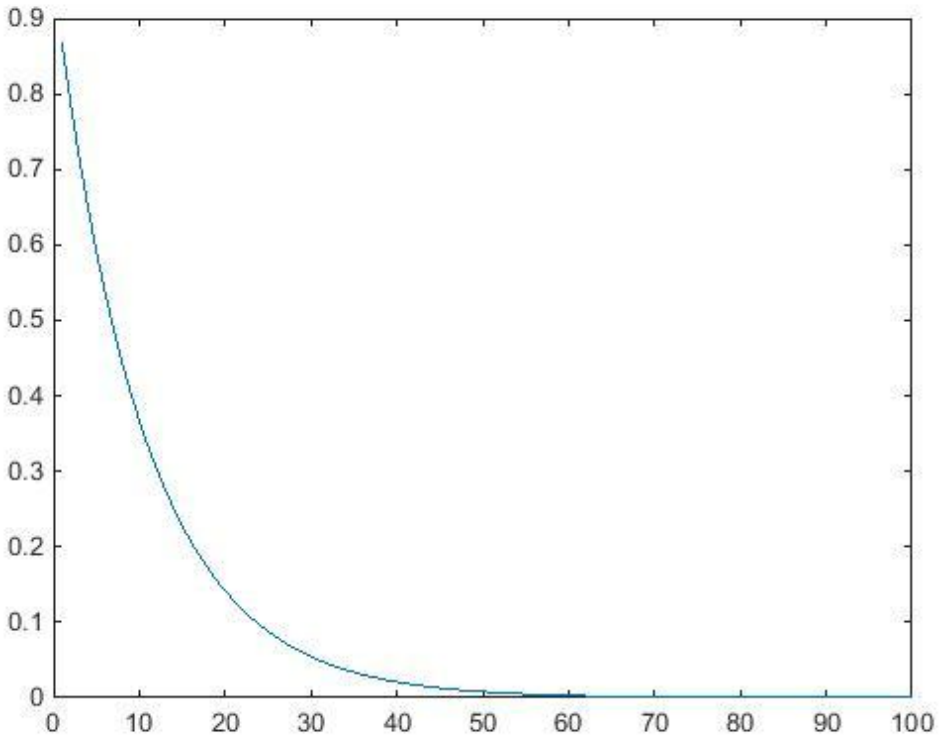
%原理 2 dy 一定时，|dp/p|与 t 成正比
% lnp=log(c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t);
% diff(lnp,y)
% c = 100;
% f = 1000;
% t = 1:1:10;
% y = 0.1;
%%fun2=(dp/p)/dy
% fun2 = @(t)-(c.*(1./(y.^2.*(y + 1).^t) - 1./y.^2 + t./(y.*(y + 1).^(t + 1))) - (f.*t)./(y + 1).^(t + 1))./(c.*(1./(y.*(y + 1).^t) - 1./y) - f./(y + 1).^t);
% plot(t,abs(fun2(t)));
```



%原理 3 dy 一定时，|dp/p|/dt>0,d(|dp/p|/dt)/dt<0

% lnp=log(c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t);

% diff(diff(lnp,y),t)

% c = 100;

% f = 1000;

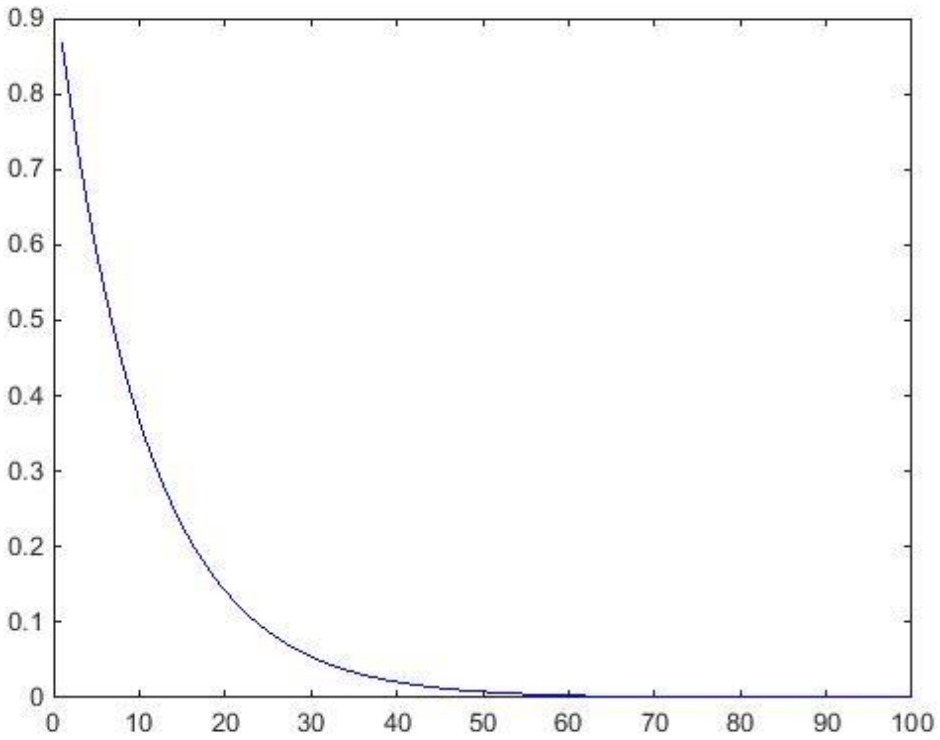
% t = 1:1:100;

% y = 0.1;

%%fun3=d(（dp/p)/dy)/dt

% fun3 = @(t)(f./(y + 1).^(t + 1) + c.*(log(y + 1)./(y.^2.*(y + 1).^t) - 1./(y.*(y + 1).^(t + 1)) + (t.*log(y + 1))./(y.*(y + 1).^(t + 1))) - (f.*t.*log(y + 1))./(y + 1).^(t + 1))./(c.*(1./(y.*(y + 1).^t) - 1./y) - f./(y + 1).^t) + (((f.*log(y + 1))./(y + 1).^t - (c.*log(y + 1))./(y.*(y + 1).^t)).*(c.*(1./(y.^2.*(y + 1).^t) - 1./y.^2 + t./(y.*(y + 1).^(t + 1))) - (f.*t)./(y + 1).^(t + 1)))./(c.*(1./(y.*(y + 1).^t) - 1./y) - f./(y + 1).^t).^2;

% plot(t,abs(fun3(t)));



%原理 4 dy 一定时，|dp/p|与 y 成反比

% lnp=log(c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t);

% diff(lnp,y)

% c = 100;

% f = 1000;

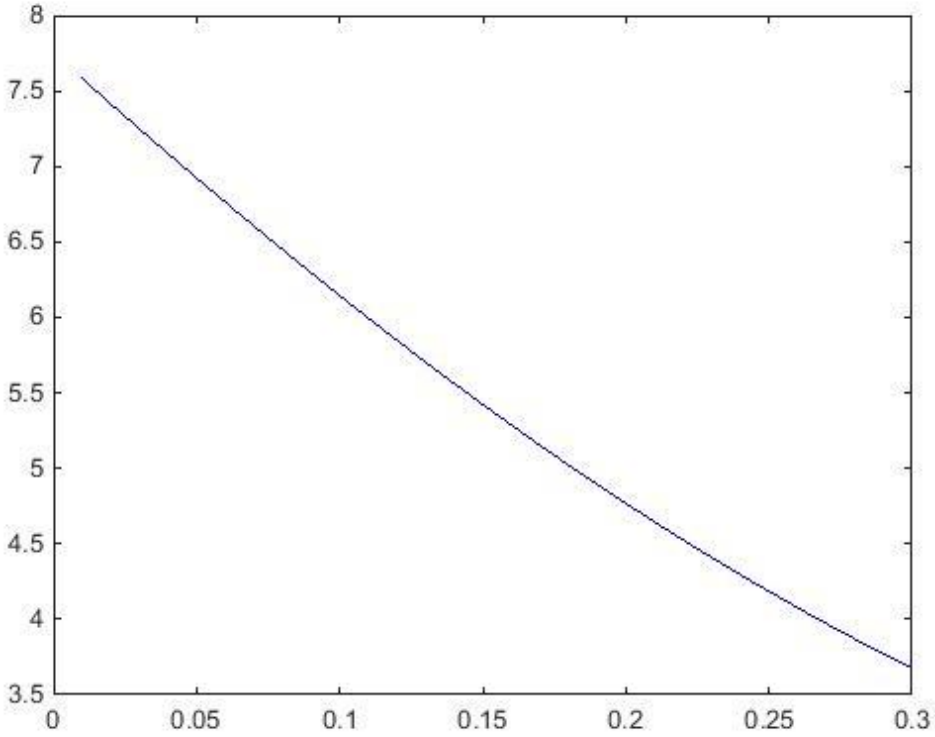
% t = 10;

% y = 0.01:0.001:0.3;

% %fun4=(dp/p)/dy

% fun4 = @(y)-(c.*(1./(y.^2.*(y + 1).^t) - 1./y.^2 + t./(y.*(y + 1).^(t + 1))) - (f.*t)./(y + 1).^(t + 1))./(c.*(1./(y.*(y + 1).^t) - 1./y) - f./(y + 1).^t);

% plot(y,abs(fun4(y)));



%原理 5 dy 一定时，|dp/p|与 c 成反比

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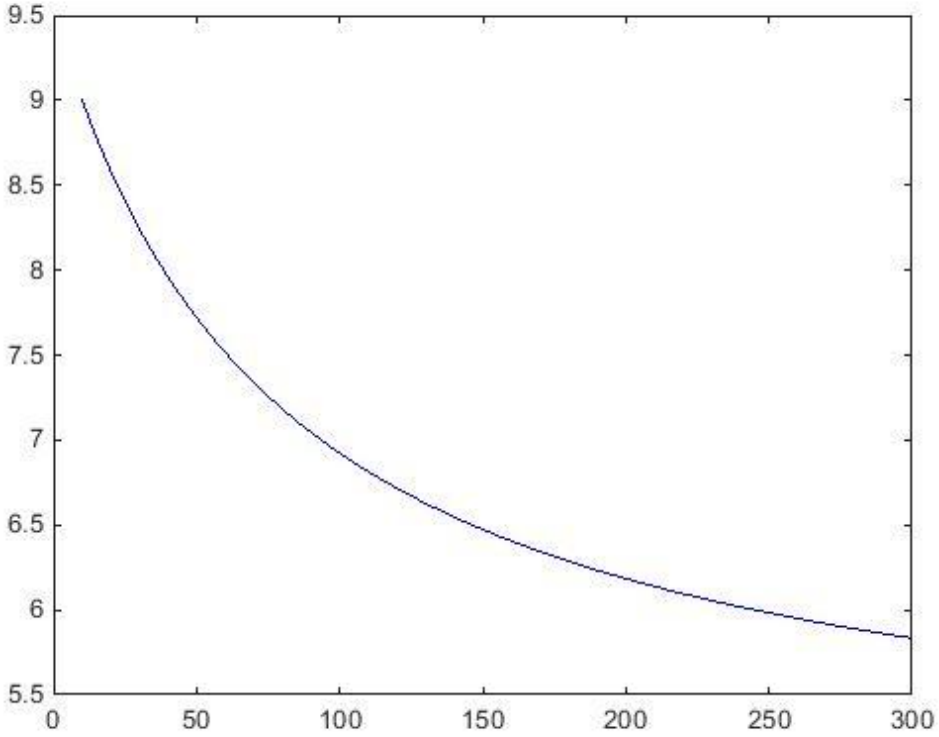
lnp=log(c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t);
diff(lnp,y)
c = 10:1:300;
f = 1000;
t = 10;
y = 0.05;
%fun5=(dp/p)/dy
fun5 =  @(c)-(c.*(1./(y.^2.*(y + 1).^t) - 1./y.^2 + t./(y.*(y + 1).^(t + 1))) - (f.*t)./(y + 1).^(t + 1))./(c.*(1./(y.*(y + 1).^t) - 1./y) - f./(y + 1).^t);
plot(c,abs(fun5(c))); syms p c y f t %p 是价格，c 是每期利息金额，y 是到期收益率，f 是面值，t 是债券期限。
p=c*(1/y-1/(y*(1+y)^t))+f/(1+y)^t;
%原理 1 p 与 y 成反比
% c = 100;
% f = 1000;
% t = 10;
% y = 0.01:0.01:0.2;
%%fun=p
% fun = @(y)c.*(1./y-1./(y.*(1+y).^t))+f./(1+y).^t;
% plot(y,fun(y));
```


9.5
9
8.5
8
7.5
7
6.5
6
5.5
0
50
100
150
200
250
300