In[226]:= (* ˘åðåäàòî÷íàÿ ôóíŒöÿ æŒîðåŒòîŁðîâàííî× æŁæòîìß äàìïôôðà õßæŒàíŁÿ Wy/δí *)

$$w = \frac{1 * 7.56 (0.47 + s) (0.47 + s)}{(0.47 + s) (41.01 + 12.80 s + s^2)}$$

$$Wt = \frac{1 * 7.56 (0.47 + s) (0.47 + s)}{(0.47 + s) (41.01 + 12.80 s + s^2)}$$

Out[226]= $\dfrac{7.56 (0.47 + s)}{41.01 + 12.8 s + s^2}$

Out[227]= $\dfrac{7.56 (0.47 + s)}{41.01 + 12.8 s + s^2}$

In[228]:= (* ˘åðåØäài îò s Œ Œîìïºåæíî× ôîðìå *)

wk = w /. s → I * omega

Out[228]= $\dfrac{7.56 (0.47 + \mathbb{i}\, omega)}{41.01 + 12.8\, \mathbb{i}\, omega - omega^2}$

In[229]:= f = (Abs[wk]) ^ 2

Out[229]= $57.1536\, Abs\left[\dfrac{0.47 + \mathbb{i}\, omega}{41.01 + 12.8\, \mathbb{i}\, omega - omega^2}\right]^2$

In[230]:= fvhod = 1 (*âıîäíî× æïåŒòð*)

Out[230]= 1

In[231]:= fvihod = f * fvhod

Out[231]= $57.1536\, Abs\left[\dfrac{0.47 + \mathbb{i}\, omega}{41.01 + 12.8\, \mathbb{i}\, omega - omega^2}\right]^2$

In[232]:= (* Ñˇ¯°Ò– *)

Plot[fvihod, {omega, 0, 300}, PlotRange → Full]
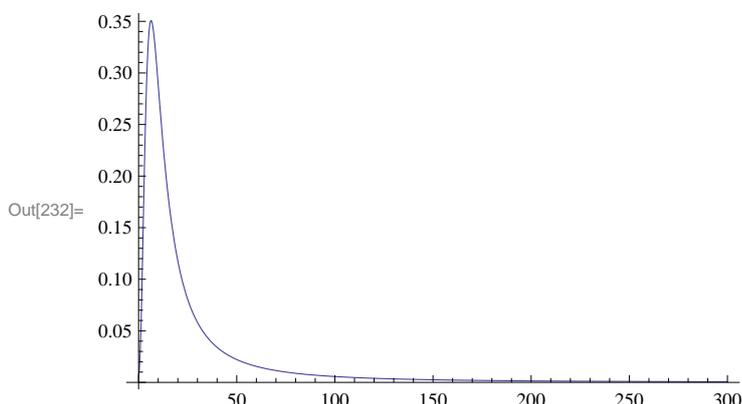
Out[232]=

In[233]:= p = NIntegrate[fvihod, {omega, 0, Infinity}]

Out[233]= 7.05158

```
In[234]:= omega0 = 0;
          shag = 0.1;
          While[shag ≥ 10^-5,
           {While[(NIntegrate[fvihod, {omega, 0, omega0}] - 0.95 * p) < 0, omega0 = omega0 + shag],
             omega0 = omega0 - shag, shag = shag / 10}]
          omega0 = omega0 - shag * 5
```

Out[237]= 161.934

```
In[238]:= p95 = NIntegrate[fvihod, {omega, 0, omega0}]
```

Out[238]= 6.699

```
In[239]:= (* ˘¯—"ˏ˜ °´À˜Ò˛´À˜"ß *)
          Tkvant = 0.1 * Pi / omega0 (* ªäå 0.1 - ïîïðàâî÷íßØ ŒîýôôˌöŁåí ò*)
```

Out[239]= 0.00194005

```
In[240]:= ht = InverseLaplaceTransform[Wt / s, s, t]
```

Out[240]= 7.56
$\left(0.0114606 + e^{(-6.4-0.223607\,i)\,t}\left((-0.00573031 + 2.07206\,i) - (0.00573031 + 2.07206\,i)\,e^{0.447214\,i\,t}\right)\right)$

```
In[260]:= Plot[ht, {t, 0, 10}, PlotRange → Full]
```

Out[260]=
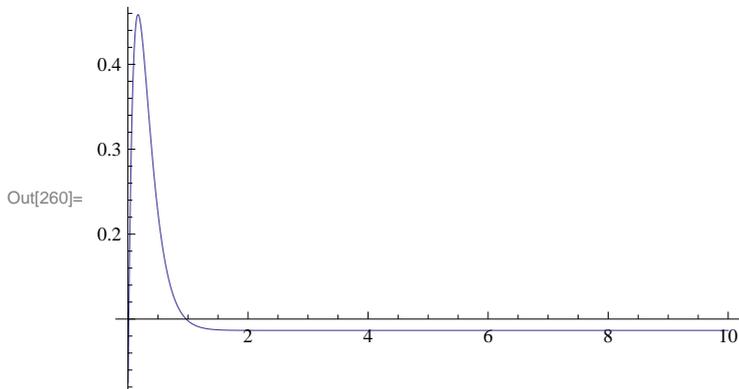

```
In[242]:= hf[t_] = Abs[ht]
```

Out[242]= 7.56 Abs$\Big[$
$0.0114606 + e^{(-6.4-0.223607\,i)\,t}\left((-0.00573031 + 2.07206\,i) - (0.00573031 + 2.07206\,i)\,e^{0.447214\,i\,t}\right)\Big]$

```
In[243]:= (* ´ðåìÿ ðåªóºŁÐî âàíŁÿ Ł ïåðåðåªóºŁÐî âàíŁÿ *)
          k = 10 000;(*Œî °-âî ïðîìåæóòî â, ªäå íàıßäŁ ðåłłåíŁå*)
          dt = 10 / k;
          hust = hf[10 000](*óæòîâŁâłååæÿ çíà÷åíŁå*);
          hmax = hf[0](*çàäàäŁì íà÷àºüíî ìàŒæ. çíà÷åíŁå*);
          (*×ŁæºŁì ðåłåíŁå óðàâíåíŁØ h(t)=0.95 Ł h(t)=1.05,
          îæŁäàŁìåíßı â îïŁ |h(t)-1|-0.05=0 Ł îïðåäåºŁì ìàŒæŁóìà*)
          For[i = 1, i < k + 1,
           {If[Sign[Abs[hf[dt * (i - 1)] - hust] - 0.05] ≠ Sign[Abs[hf[dt * (i)] - hust] - 0.05],
             Treg = dt * (i - 0.5)], If[hmax < hf[dt * i], hmax = hf[dt * i]]}; i++]
          sigmaper = Round[100 * (hmax - hust) / hust, 0.01]; (*ïåðåðåªóºŁÐî âàíŁå*)
          Print["Treg = ", Treg, " æ"]
          Print["Sigma = ", sigmaper, " %"]
```

Treg = 0.7165 æ

Sigma = 429.31 %

```mathematica
In[251]:= (*˚î°-âî ïåðŁîäâ ŒàáîôîâàíŁÿ çà âðåìÿ ðåªóºŁðôâàíŁÿ*)
         Nkvant = Ceiling[Treg / Tkvant]

Out[251]= 370

In[252]:= Stextrop = 3(*Ñòåïåíü ïîºŁíîìà ýŒòòðàïîºÿöŁŁ*);
         Masotklon = {}(*ÌàææŁâ îòŒºîíåíŁØ*);
         hizm = Table[0, {Stextrop}]
          (*ÌàææŁâ ïîæºåäíŁı Łçìåðåííßı (ðåàºüíßı) çíà÷åíŁØ Łæïîºüçóåìßı ïðŁ ýŒòòðàïîºÿöŁŁ*);

In[255]:= For[i = Stextrop - 1, i <= Nkvant, i++,
           {Ttek = Tkvant * i;
            hTtek = hf[Ttek];
            hizm[[1]] = hf[Ttek - Tkvant * 2];
            hizm[[2]] = hf[Ttek - Tkvant * 1];
            hizm[[3]] = hf[Ttek - Tkvant * 0];
            (*ÝŒòòðàïîºÿöŁÿ Ìåòîä Àäàìæà*)
            hextrop = hizm[[3]] + Tkvant * (23 * hizm[[3]] - 16 * hizm[[2]] + 5 * hizm[[1]]) / 12;
            Masotklon = Append[Masotklon, Abs[hf[Ttek + Tkvant] - hextrop]];
           }];

In[256]:= (*ÌàòåìàòŁ÷åæŒîå îæŁäàíŁå îòŒºîíåíŁÿ
            ŁæòŁííîªî çíà÷åíŁÿ îò ýŒòòðàïîºŁðôâàííîªî çíà÷åíŁÿ*)
         Matozh = Mean[Masotklon]

Out[256]= 0.00234038

In[257]:= (*Ñðåäíåå ŒâàäðàòŁ÷åæŒîå îòŒºîíåíŁå îòŒºîíåíŁÿ*)
         sigma = StandardDeviation[Masotklon]

Out[257]= 0.00233929

In[258]:= (* ˘¸—¸^ Ñ–À`ÀÒÜ´À˝¨ß *)
         b = 3 (*1..5 - äîâåðŁòåºüàÿ ªðàíŁöà*);
         Porog = Matozh + b * sigma

Out[259]= 0.00935825
```