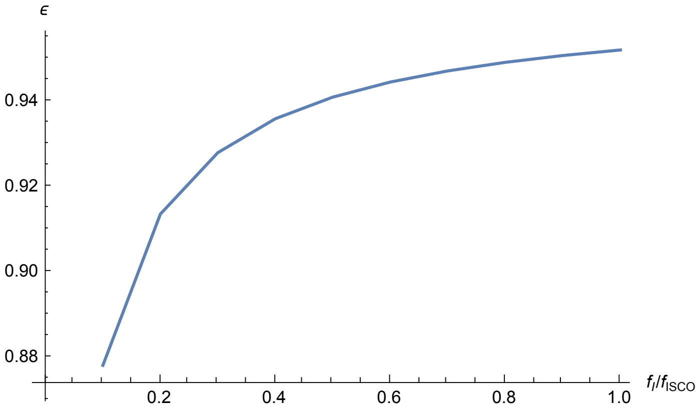
```
In[1]:= Ratio[f1val_, prec_: 40] :=
  Block[{f1 = SetPrecision[f1val, prec + 10], Msun, c, G, Mchirp, Mtot, Dist, offset,
    f0, t0, fISCO, f1r, te, ve, R, Iexact1, Iapprox1, Iexact2, Iapprox2, ϵ1, ϵ2},
   (Msun = 2 * 10^30;
    c = 3 * 10^8;
    G = 6.67 * 10^-11;
    Mchirp = 1.19 * Msun ;
    Mtot = 2.82 * Msun ;
    Dist =  1.2 * 10^24 ;
    f0 = 20;
    t0 = 165;
   offset = N[-t0 - Dist/c];
    fISCO = 1593;
    te[f_] = N[(-5 π * Mchirp^2)/(256 * (π * Mchirp)^(11/3)) * c^5/G^(5/3) * (f^(-8/3) - f0^(-8/3)) + offset];
   ve[f_] = N[(π * G * Mtot * f)^(1/3)];
    R[f_] = ve[f]/(2 π f);
    f1r = f1 * fISCO;
  Iexact1 = NIntegrate[
      R[f] * Sin[2 π * f * te[f]] - R[f0] * Sin[2 π * f0 * te[f0]], {f, f0, f1r}];
   Iapprox1 = NIntegrate[2/π * Sqrt[(R[f]^2 + R[f0]^2)/2], {f, f0, f1r}];
    ϵ1 = Iexact1/Iapprox1;
    Iexact2 = NIntegrate[
      ve[f] * Cos[2 π * f * te[f]] - ve[f0] * Cos[2 π * f0 * te[f0]], {f, f0, f1r}];
   Iapprox2 = NIntegrate[2/π * Sqrt[(ve[f]^2 + ve[f0]^2)/2], {f, f0, f1r}];
   ϵ2 = Iexact2/Iapprox2;
   {ϵ1, ϵ2}

   )]; (* Ratios of our exact integrals and approx integrals. Data are
  taken from the website https://en.wikipedia.org/wiki/GW170817 *)

In[2]:= fff1 = Table[{f1val, Ratio[f1val][[1]]}, {f1val, .1, 1, .1}]

Out[2]= {{0.1, 0.878124}, {0.2, 0.913581}, {0.3, 0.927986},
  {0.4, 0.935928}, {0.5, 0.940998}, {0.6, 0.944529},
  {0.7, 0.947138}, {0.8, 0.949146}, {0.9, 0.950743}, {1., 0.952044}}
```

In[3]:=
```
ListPlot[fff1, Joined → True, AxesLabel → {"fI/fISCO", "ϵ"}]
```

Out[3]=

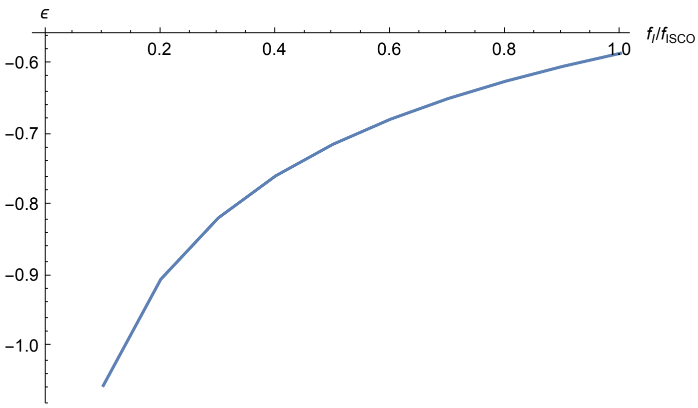


In[4]:=
```
fff2 = Table[{f1val, Ratio[f1val][[2]]}, {f1val, .1, 1, .1}]
```

Out[4]=
```
{{0.1, -1.05464}, {0.2, -0.904558}, {0.3, -0.817905},
 {0.4, -0.758335}, {0.5, -0.71363}, {0.6, -0.67823},
 {0.7, -0.649161}, {0.8, -0.62465}, {0.9, -0.603564}, {1., -0.585135}}
```

In[5]:=
```
ListPlot[fff2, Joined → True, AxesLabel → {"fI/fISCO", "ϵ"}]
```

Out[5]=



- As it is clear from the list/plot that $\epsilon_{1,2}$, i.e., the ratios of the exact results and our approximated results are always order unity numbers. This shows the consistency of the claim made in the paper.