

In[147]:= (*simple illustration of low pass filter. Nasser M. Abbasi, oct 13, 2015*)

```
Manipulate[
  h[k_, e_] := 1 / (1 + e * s) ^ k;
  Module[{tf, w, p},
    tf = h[k, e, s];
    p = BodePlot[tf, {0.1, range}, PlotLayout -> "List", ImageSize -> 400, GridLines ->
      Automatic, GridLinesStyle -> LightGray, ImageMargins -> 30, FrameLabel ->
      {{{"magnitude (db)", None}, {"ω (rad/sec)", "H(s) Magnitude plot"}},
      {"phase(deg)", None}, {"Frequency (rad/sec)", None}}}, PlotRange ->
      {{{0.1, range}, Automatic}, {{0.1, 100}, Automatic}}, BaseStyle -> 14];
    Text@Grid[{
      {Style[Row[{"H(s) =  $\frac{1}{(1 + \epsilon s)^k} =$ ", tf}], 16]},
      {
        p[[1]]
        (*
        LogPlot[1/(1+e^2*w^2)^(k/2),
          {w, 0.1, range}, PlotRange->All, ImageSize->300, Frame->True,
          FrameLabel->{{"|H(s)|", None}, {"ω", "Low pass filter"}}, ImageMargins->10,
          GridLines->Automatic, GridLinesStyle->LightGray, Epilog->{Dashed,
            Line[{{1/e, 0}, {1/e, 1/2^(k/2)}}], Line[{{1/e, 1/2^(k/2)}, {0, 1/2^(k/2)}}]}]}
        *)
      }
    ], Alignment -> Center, Frame -> All, FrameStyle -> LightGray, Spacings -> {1, 1}
  ]
],
{{k, 4, "k"}, 1, 20, 1, Appearance -> "Labeled"},
{{e, .1, "ε"}, 0.01, 1, .01, Appearance -> "Labeled"},
{{range, 1000, "max ω"}, 1, 1000, 1, Appearance -> "Labeled"},
TrackedSymbols -> {k, e, range}
]
```

