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In[11]:= InnerProduct = DotProduct;
In[12]:= ScalarProduct = RealVectorScalarProduct;
In[13]:= VectorSum = RealVectorSum;
In[14]:= v[1] = {1.0, 1.0, 1.0, 1.0}
Out[14]= {1., 1., 1., 1.}
In[15]:= v[2] = {0.0, 1.0, 2.0, 3.0}
Out[15]= {0., 1., 2., 3.}
In[16]:= B = {v[1], v[2]}
Out[16]= {{1., 1., 1., 1.}, {0., 1., 2., 3.}}
In[17]:= ON = OrthonormalBasis[B]
Out[17]= {{0.5, 0.5, 0.5, 0.5}, {-0.67082, -0.223607, 0.223607, 0.67082}}
In[18]:= L = {Log[1000.0], Log[2000.0], Log[4200.0], Log[8300.0]}
Out[18]= {6.90776, 7.6009, 8.34284, 9.02401}
In[19]:= u = ProjectionVector[L, ON]
Out[19]= {6.90527, 7.61434, 8.32341, 9.03248}
In[20]:= Solve[u == a * v[1] + b * v[2], {a, b}]
Out[20]= {{a -> 6.90527, b -> 0.70907}}
In[21]:= E^(6.9052715007745356)
Out[21]= 997.519
In[22]:= P[t_] := 997.519 E^(0.70907 t)
In[23]:= P[5]
Out[23]= 34565.8

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In[24]:= Show[ListPlot[{{0, 1000}, {1, 2000}, {2, 4200}, {3, 8300}},  
  PlotStyle -> {AbsolutePointSize[8], Red}, AxesLabel -> {"Year", "Population"},  
  Plot[P[t], {t, 0, 5}, PlotStyle -> {Blue, Thickness[.01]}]]
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