

Feynman Data

```
In[1]:= dir=NotebookDirectory[]

Out[1]= /Users/nathanhaut/Library/Mobile
          Documents/com~apple~CloudDocs/MSU/Research/Feynman Data/

In[2]:= GenerateData[func_,ranges_,eqNum_]:=Block[
  {trainInput,trainResponse,fullTrain,train,testInput,testResponse,fullTest,test},

  (*Training Data*)
  trainInput=RandomReal[#,100]&/@ranges;
  trainResponse=func[#/.(List→Sequence)]&/@Transpose[trainInput];
  fullTrain=Transpose[Append[trainInput,trainResponse]];
  train=Prepend[fullTrain,Append[Table["x"<>ToString@i,{i,1,Length@ranges}],"y"]];
  Export[dir<>ToString[eqNum]<>"_Train.csv",train];

  (*Testing Data*)
  testInput=RandomReal[#,100]&/@ranges;
  testResponse=func[#/.(List→Sequence)]&/@Transpose[testInput];
  fullTest=Transpose[Append[testInput,testResponse]];
  test=Prepend[fullTest,Append[Table["x"<>ToString@i,{i,1,Length@ranges}],"y"]];
  Export[dir<>ToString[eqNum]<>"_Test.csv",test];

]

]
```

EQ 1: $\frac{e^{\left(\frac{-\theta^2}{2}\right)}}{\sqrt{2\pi}}$

```
In[3]:= Clear[f]
f[\theta_]:= \frac{E^{\left(\frac{-\theta^2}{2}\right)}}{\text{Sqrt}[2*\pi]}

In[4]:= GenerateData[f, {{1, 3}}, 1]
```

$$\text{EQ 2: } \frac{E^{\left(\frac{-(\theta/\sigma)^2}{2}\right)}}{\text{Sqrt}(2*\pi)*\sigma}$$

```
In[1]:= Clear[f]
In[2]:= f[\theta_, \sigma_] := E^((-(\theta/\sigma)^2)/2) / Sqrt(2*\pi)*\sigma
In[3]:= GenerateData[f, {{1, 3}, {1, 3}}, 2]
```

$$\text{EQ 3: } \frac{E^{\left(\frac{-((\theta-\theta_1)/\sigma)^2}{2}\right)}}{\text{Sqrt}(2*\pi)*\sigma}$$

```
In[1]:= Clear[f]
In[2]:= f[\theta_, \theta1_, \sigma_] := E^((-(\theta-\theta1)/\sigma)^2)/2 / Sqrt[2*\pi]*\sigma
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}}, 3]
```

$$\text{EQ 4: } \text{Sqrt}[(x_2 - x_1)^2 + (y_2 - y_1)^2]$$

```
In[1]:= Clear[f]
In[2]:= f[x1_, x2_, y1_, y2_] := Sqrt[(x2 - x1)^2 + (y2 - y1)^2]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 4]
```

$$\text{EQ 5: } \frac{G*m_1*m_2}{(x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2}$$

```
In[1]:= Clear[f]
In[2]:= f[G_, m1_, m2_, x1_, x2_, y1_, y2_, z1_, z2_] := G*m1*m2 / ((x2 - x1)^2 + (y2 - y1)^2 + (z2 - z1)^2)
In[3]:= GenerateData[f,
{{1, 2}, {1, 2}, {1, 2}, {3, 4}, {1, 2}, {3, 4}, {1, 2}, {3, 4}, {1, 2}}, 5]
```

$$\text{EQ 6: } \frac{m_0}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$$

```
In[1]:= Clear[f]
```

```
In[1]:= f[m_, v_, c_] := m/Sqrt[1 - v^2/c^2]
In[2]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}}, 6]
```

EQ 7: $x_1 y_1 + x_2 y_2 + x_3 y_3$

```
In[1]:= Clear[f]
In[2]:= f[x1_, x2_, x3_, y1_, y2_, y3_] := x1*y1 + x2*y2 + x3*y3
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 7]
```

EQ 8: $\mu * N_n$

```
In[1]:= Clear[f]
In[2]:= f[\mu_, N_] := \mu * N
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 8]
```

EQ 9: $\frac{1}{2} m * (v^2 + u^2 + w^2)$

```
In[1]:= Clear[f]
In[2]:= f[m_, v_, u_, w_] := 1/2 m * (v^2 + u^2 + w^2)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 9]
```

EQ 10: $\frac{q_1 * q_2 * r}{4 * \pi * \epsilon * r^3}$

```
In[1]:= Clear[f]
In[2]:= f[q1_, q2_, r_, \epsilon_] := q1 * q2 * r / (4 * \pi * \epsilon * r^3)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 10]
```

EQ 11: $\frac{q1 * r}{4 * \pi * \epsilon * r^3}$

```
In[1]:= Clear[f]
In[2]:= f[q1_, r_, \epsilon_] := q1 * r / (4 * \pi * \epsilon * r^3)
```

```
In[8]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 11]
```

EQ 12: $q_2 * E_f$

```
In[9]:= Clear[f]
```

```
In[10]:= f[q2_, Ef_] := q2 * Ef
```

```
In[11]:= GenerateData[f, {{1, 5}, {1, 5}}, 12]
```

EQ 13: $q * (E_f + B * v * \sin[\theta])$

```
In[12]:= Clear[f]
```

```
In[13]:= f[q_, e_, B_, v_, theta_] := q * (e + B * v * Sin[theta])
```

```
In[14]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 13]
```

EQ 14: $G * m1 * m2 * \left(\frac{1}{r2} - \frac{1}{r1} \right)$

```
In[15]:= Clear[f]
```

```
In[16]:= f[G_, m1_, m2_, r1_, r2_] := G * m1 * m2 * \left( \frac{1}{r2} - \frac{1}{r1} \right)
```

```
In[17]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 14]
```

EQ 15: $m * g * z$

```
In[18]:= Clear[f]
```

```
In[19]:= f[m_, g_, z_] := m * g * z
```

```
In[20]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 15]
```

EQ 16: $\frac{1}{2} * k * x^2$

```
In[21]:= Clear[f]
```

```
In[22]:= f[k_, x_] := \frac{1}{2} * k * x^2
```

```
In[23]:= GenerateData[f, {{1, 5}, {1, 5}}, 16]
```

EQ 17: $\frac{x - u * t}{\text{Sqrt}\left[1 - \frac{u^2}{c^2}\right]}$

```
In[1]:= Clear[f]
In[2]:= f[x_, u_, c_, t_] := (x - u * t) / Sqrt[1 - u^2 / c^2]
In[3]:= GenerateData[f, {{5, 10}, {1, 2}, {3, 20}, {1, 2}}, 17]
```

EQ 18: $\frac{t - u * \frac{x}{c^2}}{\text{Sqrt}\left[1 - \frac{u^2}{c^2}\right]}$

```
In[1]:= Clear[f]
In[2]:= f[t_, u_, c_, x_] := (t - u * x / c^2) / Sqrt[1 - u^2 / c^2]
In[3]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}, {1, 5}}, 18]
```

EQ 19: $\frac{m * v}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$

```
In[1]:= Clear[f]
In[2]:= f[m_, v_, c_] := m * v / Sqrt[1 - v^2 / c^2]
In[3]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}}, 19]
```

EQ 20: $\frac{u + v}{1 + u * \frac{v}{c^2}}$

```
In[1]:= Clear[f]
In[2]:= f[u_, v_, c_] := (u + v) / (1 + u * v / c^2)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 20]
```

EQ 21: $\frac{m_1 * r1 + m_2 * r2}{m_1 + m_2}$

```
In[1]:= Clear[f]
```

```
In[6]:= f[m1_, m2_, r1_, r2_] :=  $\frac{m1 * r1 + m2 * r2}{m1 + m2}$ 
In[6]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 21]
```

EQ 22: $r^*f^*\sin[\theta]$

```
In[6]:= Clear[f]
In[6]:= f[r_, f_, θ_] := r * f * Sin[θ]
In[6]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 22]
```

EQ 23: $m^*r^*v^*\sin[\theta]$

```
In[6]:= Clear[f]
In[6]:= f[m_, r_, v_, θ_] := m * r * v * Sin[θ]
In[6]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 23]
```

EQ 24: $\frac{1}{4} * m * (\omega^2 + \omega_1^2) * x^2$

```
In[6]:= Clear[f]
In[6]:= f[m_, ω_, ω1_, x_] :=  $\frac{1}{4} * m * (\omega^2 + \omega_1^2) * x^2$ 
In[6]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}}, 24]
```

EQ 25: $\frac{q}{c}$

```
In[6]:= Clear[f]
In[6]:= f[q_, c_] :=  $\frac{q}{c}$ 
In[6]:= GenerateData[f, {{1, 5}, {1, 5}}, 25]
```

EQ 26: $\text{ArcSin}[n^*\sin[\theta]]$

```
In[6]:= Clear[f]
In[6]:= f[n_, θ_] := ArcSin[n * Sin[θ]]
In[6]:= GenerateData[f, {{0, 1}, {1, 5}}, 26]
```

EQ 27: $\frac{1}{\frac{1}{d_1} + \frac{n}{d_2}}$

```
In[1]:= Clear[f]
In[2]:= f[d1_, d2_, n_] := 1/(1/d1 + n/d2)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 27]
```

EQ 28: $\frac{\omega}{c}$

```
In[1]:= Clear[f]
In[2]:= f[\omega_, c_] := \omega/c
In[3]:= GenerateData[f, {{1, 10}, {1, 10}}, 28]
```

EQ 29: $\text{Sqrt}[x1^2 + x2^2 - 2 * x1 * x2 * \text{Cos}[\theta1 - \theta2]]$

```
In[1]:= Clear[f]
In[2]:= f[x1_, x2_, \theta1_, \theta2_] := Sqrt[x1^2 + x2^2 - 2 * x1 * x2 * Cos[\theta1 - \theta2]]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 29]
```

EQ 30: $L * \frac{\text{Sin}\left[n * \frac{\theta}{2}\right]^2}{\text{Sin}\left[\frac{\theta}{2}\right]^2}$

```
In[1]:= Clear[f]
In[2]:= f[L_, n_, \theta_] := L * Sin[n * \theta/2]^2 / Sin[\theta/2]^2
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 30]
```

EQ 31: $\text{ArcSin}\left[\frac{\lambda}{n*d}\right]$

```
In[1]:= Clear[f]
In[2]:= f[\lambda_, n_, d_] := ArcSin[\lambda / (n * d)]
In[3]:= GenerateData[f, {{1, 2}, {1, 5}, {2, 5}}, 31]
```

$$\text{EQ 32: } \frac{q^2 a^2}{6 \pi * \epsilon * c^3}$$

```
In[1]:= Clear[f]
In[2]:= f[q_, a_, \[Epsilon]_, c_] := \frac{q^2 a^2}{6 \pi * \epsilon * c^3}
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 32]
```

$$\text{EQ 33: } \left(\frac{1}{2} * \epsilon * c * E^2 \right) \left(8 \pi * \frac{r^2}{3} \right) \left(\frac{\omega^4}{(\omega^2 - \omega_1^2)^2} \right)$$

```
In[1]:= Clear[f]
In[2]:= f[\[Epsilon]_, c_, E1_, r_, \[Omega]_, \[Omega]1_] := \left( \frac{1}{2} * \epsilon * c * E1^2 \right) \left( 8 \pi * \frac{r^2}{3} \right) \left( \frac{\omega^4}{(\omega^2 - \omega_1^2)^2} \right)
In[3]:= GenerateData[f, {{1, 2}, {1, 2}, {1, 2}, {1, 2}, {1, 2}, {3, 5}}, 33]
```

$$\text{EQ 34: } \frac{q * v * B}{p}$$

```
In[1]:= Clear[f]
In[2]:= f[q_, v_, B_, p_] := \frac{q * v * B}{p}
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 34]
```

$$\text{EQ 35: } \frac{\omega}{1 - \frac{v}{c}}$$

```
In[1]:= Clear[f]
In[2]:= f[\[Omega]_, v_, c_] := \frac{\omega}{1 - \frac{v}{c}}
In[3]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}}, 35]
```

$$\text{EQ 36: } \frac{1+v/c}{\text{Sqrt}\left[1-\frac{v^2}{c^2}\right]} * \omega$$

```
In[1]:= Clear[f]
```

```
In[1]:= f[v_, c_, ω_] := (1 + v/c) / Sqrt[1 - v^2/c^2] * ω
In[2]:= GenerateData[f, {{1, 2}, {3, 10}, {1, 5}}, 36]
```

EQ 37: $h^* \omega$

```
In[1]:= Clear[f]
In[2]:= f[h_, ω_] := h * ω
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 37]
```

EQ 38: $|l_1 + l_2 + 2\sqrt{l_1 l_2} \cos[\delta]|$

```
In[1]:= Clear[f]
In[2]:= f[l1_, l2_, δ_] := l1 + l2 + 2 * Sqrt[l1 * l2] * Cos[δ]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 38]
```

EQ 39: $\frac{4\pi\epsilon\hbar^2}{m q^2}$

```
In[1]:= Clear[f]
In[2]:= f[ε_, h_, m_, q_] := (4 * π * ε * h^2) / (m * q^2)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 39]
```

EQ 40: $\frac{3}{2} * p * v$

```
In[1]:= Clear[f]
In[2]:= f[p_, v_] := (3/2) * p * v
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 40]
```

EQ 41: $\frac{1}{γ-1} * p * v$

```
In[1]:= Clear[f]
In[2]:= f[γ_, p_, v_] := 1/(γ - 1) * p * v
```

```
In[1]:= GenerateData[f, {{2, 5}, {1, 5}, {1, 5}}, 41]
```

$$\text{EQ 42: } \frac{n*k*T}{v}$$

```
In[2]:= Clear[f]
```

$$In[3]:= f[n_, k_, T_, v_] := \frac{n*k*T}{v}$$

```
In[4]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 42]
```

$$\text{EQ 43: } n * \text{Exp}\left[\frac{m*g*x}{k*T}\right]$$

```
In[5]:= Clear[f]
```

$$In[6]:= f[n_, m_, g_, x_, k_, T_] := n * \text{Exp}\left[\frac{m*g*x}{k*T}\right]$$

```
In[7]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 43]
```

$$\text{EQ 44: } \frac{h*\omega^3}{\pi^2*c^2*(\text{Exp}\left[\frac{h*\omega}{k*T}\right] - 1)}$$

```
In[8]:= Clear[f]
```

$$In[9]:= f[h_, \omega_, c_, k_, T_] := \frac{h*\omega^3}{\pi^2*c^2*(\text{Exp}\left[\frac{h*\omega}{k*T}\right] - 1)}$$

```
In[10]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 44]
```

$$\text{EQ 45: } \frac{u*q*v}{d}$$

```
In[11]:= Clear[f]
```

$$In[12]:= f[u_, q_, v_, d_] := \frac{u*q*v}{d}$$

```
In[13]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 45]
```

$$\text{EQ 46: } u*k*T$$

```
In[14]:= Clear[f]
```

$$In[15]:= f[u_, k_, T_] := u*k*T$$

```
In[16]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 46]
```

$$\text{EQ 47: } \frac{1}{\gamma - 1} * \frac{k*v}{A}$$

```
In[1]:= Clear[f]
In[2]:= f[\gamma_, k_, v_, A_] := 1/(\gamma - 1) * k*v/A
In[3]:= GenerateData[f, {{2, 5}, {1, 5}, {1, 5}, {1, 5}}, 47]
```

$$\text{EQ 48: } n * k * T * \ln \left[\frac{v_2}{v_1} \right]$$

```
In[1]:= Clear[f]
In[2]:= f[n_, k_, T_, v2_, v1_] := n*k*T*Log[v2/v1]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 48]
```

$$\text{EQ 49: } \sqrt{\frac{\gamma * pr}{\rho}}$$

```
In[1]:= Clear[f]
In[2]:= f[\gamma_, pr_, \rho_] := Sqrt[\gamma * pr / \rho]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 49]
```

$$\text{EQ 50: } \frac{m*c^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

```
In[1]:= Clear[f]
In[2]:= f[m_, c_, v_] := m*c^2 / Sqrt[1 - v^2/c^2]
In[3]:= GenerateData[f, {{1, 5}, {3, 10}, {1, 2}}, 50]
```

$$\text{EQ 51: } x1 * (\cos[\omega * t] + \alpha * \cos[\omega * t]^2)$$

```
In[1]:= Clear[f]
In[2]:= f[x1_, \omega_, t_, \alpha_] := x1 * (\Cos[\omega*t] + \alpha * \Cos[\omega*t]^2)
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}}, 51]
```

EQ 52: $\frac{k(T_2 - T_1) A}{d}$

```
In[1]:= Clear[f]
In[2]:= f[k_, T2_, T1_, A_, d_] :=  $\frac{k(T_2 - T_1) A}{d}$ 
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 52]
```

EQ 53: $\frac{P}{4\pi r^2}$

```
In[1]:= Clear[f]
In[2]:= f[P_, r_] :=  $\frac{P}{4\pi r^2}$ 
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 53]
```

EQ 54: $\frac{q}{4\pi\epsilon r}$

```
In[1]:= Clear[f]
In[2]:= f[q_, \epsilon_, r_] :=  $\frac{q}{4\pi\epsilon r}$ 
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 54]
```

EQ 55: $\frac{1}{4\pi\epsilon} * \frac{p \cos[\theta]}{r^2}$

```
In[1]:= Clear[f]
In[2]:= f[\epsilon_, p_, \theta_, r_] :=  $\frac{1}{4\pi\epsilon} * \frac{p \cos[\theta]}{r^2}$ 
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}}, 55]
```

EQ 56: $\frac{3}{4\pi\epsilon} * \frac{p z}{r^5} * \text{Sqrt}[x^2 + y^2]$

```
In[1]:= Clear[f]
In[2]:= f[\epsilon_, p_, z_, r_, x_, y_] :=  $\frac{3}{4\pi\epsilon} * \frac{p z}{r^5} * \text{Sqrt}[x^2 + y^2]$ 
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}}, 56]
```

EQ 57: $\frac{3}{4\pi*\epsilon} * \frac{p}{r^3 * \cos[\theta] * \sin[\theta]}$

```
In[1]:= Clear[f]
In[2]:= f[epsilon_, p_, r_, theta_] := (3/(4*Pi*epsilon)) * (p/(r^3 * Cos[theta] * Sin[theta]))
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}}, 57]
```

EQ 58: $\frac{3}{5} * \frac{q^2}{4*\pi*\epsilon*d}$

```
In[1]:= Clear[f]
In[2]:= f[q_, epsilon_, d_] := (3/(5*(4*Pi*epsilon*d))) * (q^2)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 58]
```

EQ 59: $\frac{\epsilon * E^2}{2}$

```
In[1]:= Clear[f]
In[2]:= f[epsilon_, e_] := (epsilon * e^2)/2
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 59]
```

EQ 60: $\frac{\sigma}{\epsilon} * \frac{1}{1+\chi}$

```
In[1]:= Clear[f]
In[2]:= f[sigma_, epsilon_, chi_] := (sigma/(epsilon * (1 + chi)))
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 60]
```

EQ 61: $\frac{q * E}{m * (\omega_0^2 + \omega^2)}$

```
In[1]:= Clear[f]
In[2]:= f[q_, e_, m_, omega0_, omega_] := (q * e) / (m * (omega0^2 + omega^2))
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {3, 5}, {1, 2}}, 61]
```

$$\text{EQ 62: } n * \left(1 + \frac{p * E * \cos[\theta]}{k * T} \right)$$

```
In[1]:= Clear[f]
In[2]:= f[n_, p_, e_, θ_, k_, T_] := n * (1 + p * e * Cos[θ] / (k * T))
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}}, 62]
```

$$\text{EQ 63: } \frac{n * p^2 * E}{3 * k * T}$$

```
In[1]:= Clear[f]
In[2]:= f[n_, p_, e_, k_, T_] := (n * p^2 * e) / (3 * k * T)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 63]
```

$$\text{EQ 64: } \frac{n * α}{1 - n * \frac{α}{3}} * ε * E$$

```
In[1]:= Clear[f]
In[2]:= f[n_, α_, ε_, e_] := (n * α) * ε * e / (1 - n * α / 3)
In[3]:= GenerateData[f, {{0, 1}, {0, 1}, {1, 2}, {1, 2}}, 64]
```

$$\text{EQ 65: } 1 + \frac{n * α}{1 - (n * \frac{α}{3})}$$

```
In[1]:= Clear[f]
In[2]:= f[n_, α_] := 1 + (n * α) / (1 - (n * α / 3))
In[3]:= GenerateData[f, {{0, 1}, {0, 1}}, 65]
```

$$\text{EQ 66: } \frac{1}{4 * π * ε * c^2} * \frac{2 * l}{r}$$

```
In[1]:= Clear[f]
In[2]:= f[ε_, c_, l_, r_] := 1 / (4 * π * ε * c^2) * (2 * l) / r
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 66]
```

EQ 67: $\frac{p}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$

```
In[67]:= Clear[f]
In[67]:= f[p_, v_, c_] :=  $\frac{p}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$ 
In[67]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}}, 67]
```

EQ 68: $\frac{p * v}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$

```
In[68]:= Clear[f]
In[68]:= f[p_, v_, c_] :=  $\frac{p * v}{\text{Sqrt}\left[1 - \frac{v^2}{c^2}\right]}$ 
In[68]:= GenerateData[f, {{1, 5}, {1, 2}, {3, 10}}, 68]
```

EQ 69: $-u * B * \text{Cos}[\theta]$

```
In[69]:= Clear[f]
In[69]:= f[u_, B_, θ_] := -u * B * Cos[θ]
In[69]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 69]
```

EQ 70: $-p * E * \text{Cos}[\theta]$

```
In[70]:= Clear[f]
In[70]:= f[p_, e_, θ_] := -p * e * Cos[θ]
In[70]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 70]
```

EQ 71: $\frac{q}{4 * \pi * ε * r * (1 - v / c)}$

```
In[71]:= Clear[f]
In[71]:= f[q_, ε_, r_, v_, c_] :=  $\frac{q}{4 * \pi * ε * r * (1 - v / c)}$ 
In[71]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 2}, {3, 10}}, 71]
```

EQ 72: $\text{Sqrt} \left[\frac{\omega^2}{c^2 - \frac{\pi^2}{d^2}} \right]$

```
In[1]:= Clear[f]
In[2]:= f[\[omega]_, c_, d_] := Sqrt[\[omega]^2/(c^2 - \[Pi]^2/d^2)]
In[3]:= GenerateData[f, {{2, 4}, {4, 6}, {1, 2}}, 72]
```

EQ 73: $\epsilon * c * E^2$

```
In[1]:= Clear[f]
In[2]:= f[\[Epsilon]_, c_, e_] := \[Epsilon] * c * e^2
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 73]
```

EQ 74: $\epsilon * E^2$

```
In[1]:= Clear[f]
In[2]:= f[\[Epsilon]_, e_] := \[Epsilon] * e^2
In[3]:= GenerateData[f, {{1, 5}, {1, 5}}, 74]
```

EQ 75: $\frac{q * v}{2 * \pi * r}$

```
In[1]:= Clear[f]
In[2]:= f[q_, v_, r_] := q * v / (2 * \[Pi] * r)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 75]
```

EQ 76: $q * v * r / 2$

```
In[1]:= Clear[f]
In[2]:= f[q_, v_, r_] := q * v * r / 2
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 76]
```

$$\text{EQ 77: } \frac{g * q * B}{2 * m}$$

```
In[1]:= Clear[f]
In[2]:= f[g_, q_, B_, m_] := g * q * B / (2 * m)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 77]
```

$$\text{EQ 78: } \frac{q * h}{4 * \pi * m}$$

```
In[1]:= Clear[f]
In[2]:= f[q_, h_, m_] := q * h / (4 * \[Pi] * m)
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 78]
```

$$\text{EQ 79: } \frac{g * u * B * J}{\hbar}$$

```
In[1]:= Clear[f]
In[2]:= f[g_, u_, B_, J_, \[Hbar]] := g * u * B * J / \[Hbar]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 79]
```

$$\text{EQ 80: } \frac{n}{\text{Exp}\left[\frac{u*B}{k*T}\right] + \text{Exp}\left[\frac{-u*B}{k*T}\right]}$$

```
In[1]:= Clear[f]
In[2]:= f[n_, u_, B_, k_, T_] := n / (Exp[u*B / (k*T)] + Exp[-u*B / (k*T)])
In[3]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}}, 80]
```

$$\text{EQ 81: } n * u * \text{Tanh}\left[\frac{u * B}{k * T}\right]$$

```
In[1]:= Clear[f]
In[2]:= f[n_, u_, B_, k_, T_] := n * u * Tanh[u * B / (k * T)]
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 81]
```

$$\text{EQ 82: } \frac{u * B}{k * T} + \frac{u * \alpha * M}{\epsilon * c^2 * k * T}$$

```
In[8]:= Clear[f]
In[8]:= f[u_, B_, k_, T_, α_, M_, ε_, c_] := u * B / k * T + u * α * M / (ε * c^2 * k * T)
In[8]:= GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 3}}, 82]
```

$$\text{EQ 83: } u^*(1+\chi)^*B$$

```
In[8]:= Clear[f]
In[8]:= f[u_, χ_, B_] := u * (1 + χ) * B
In[8]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 83]
```

$$\text{EQ 84: } \frac{Y * A * x}{d}$$

```
In[8]:= Clear[f]
In[8]:= f[Y_, A_, x_, d_] := Y * A * x / d
In[8]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 84]
```

$$\text{EQ 85: } \frac{Y}{2 * (1 + σ)}$$

```
In[8]:= Clear[f]
In[8]:= f[Y_, σ_] := Y / (2 * (1 + σ))
In[8]:= GenerateData[f, {{1, 5}, {1, 5}}, 85]
```

$$\text{EQ 86: } \frac{1}{\text{Exp}\left[\frac{\hbar * \omega}{k * T}\right] - 1}$$

```
In[8]:= Clear[f]
In[8]:= f[ℏ_, ω_, k_, T_] := 1 / (Exp[ℏ * ω / (k * T)] - 1)
In[8]:= GenerateData[f, {{1, 5}, {1, 3}, {1, 3}, {1, 3}}, 86]
```

EQ 87: $\frac{\hbar * \omega}{\text{Exp}\left[\frac{\hbar * \omega}{k * T}\right] - 1}$

In[1]:= **Clear[f]**

$$\text{f}[\hbar_, \omega_, k_, T_] := \frac{\hbar * \omega}{\text{Exp}\left[\frac{\hbar * \omega}{k * T}\right] - 1}$$

In[2]:= **GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 87]**

EQ 88: $\frac{2 * u * B}{\hbar}$

In[3]:= **Clear[f]**

$$\text{f}[u_, B_, \hbar_] := \frac{2 * u * B}{\hbar}$$

In[4]:= **GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 88]**

EQ 89: $\text{Sin}\left[\frac{E * t}{\hbar}\right]^2$

In[5]:= **Clear[f]**

$$\text{f}[e_, t_, \hbar_] := \text{Sin}\left[\frac{e * t}{\hbar}\right]^2$$

In[6]:= **GenerateData[f, {{1, 2}, {1, 2}, {1, 4}}, 89]**

EQ 90: $\frac{p * E * t}{\hbar} * \frac{\text{Sin}\left[\frac{(\omega - \omega_0) * t}{2}\right]^2}{\left(\frac{(\omega - \omega_0) * t}{2}\right)^2}$

In[7]:= **Clear[f]**

$$\text{f}[p_, e_, t_, \hbar_, \omega_, \omega_0_] := \frac{p * e * t}{\hbar} * \frac{\text{Sin}\left[\frac{(\omega - \omega_0) * t}{2}\right]^2}{\left(\frac{(\omega - \omega_0) * t}{2}\right)^2}$$

In[8]:= **GenerateData[f, {{1, 3}, {1, 3}, {1, 3}, {1, 3}, {1, 5}, {1, 5}}, 90]**

EQ 91: $u * \text{Sqrt}[Bx^2 + By^2 + Bz^2]$

In[9]:= **Clear[f]**

$$\text{f}[u_, Bx_, By_, Bz_] := u * \text{Sqrt}[Bx^2 + By^2 + Bz^2]$$

```
In[8]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 91]
```

EQ 92: $n^*\hbar$

```
In[9]:= Clear[f]
```

```
In[10]:= f[n_, \hbar_] := n * \hbar
```

```
In[11]:= GenerateData[f, {{1, 5}, {1, 5}}, 92]
```

EQ 93: $\frac{2*E*d^2*k}{\hbar}$

```
In[12]:= Clear[f]
```

```
In[13]:= f[e_, d_, k_, \hbar_] := \frac{2 * e * d^2 * k}{\hbar}
```

```
In[14]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 93]
```

EQ 94: $l * \left(\text{Exp} \left[\frac{q*v}{k*T} \right] - 1 \right)$

```
In[15]:= Clear[f]
```

```
In[16]:= f[l_, q_, v_, k_, T_] := l * \left( \text{Exp} \left[ \frac{q * v}{k * T} \right] - 1 \right)
```

```
In[17]:= GenerateData[f, {{1, 5}, {1, 2}, {1, 2}, {1, 2}, {1, 2}}, 94]
```

EQ 95: $2*U*(1-\text{Cos}[k*d])$

```
In[18]:= Clear[f]
```

```
In[19]:= f[U_, k_, d_] := 2 * U * (1 - Cos[k * d])
```

```
In[20]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 95]
```

EQ 96: $\frac{\hbar^2}{2*E*d^2}$

```
In[21]:= Clear[f]
```

```
In[22]:= f[\hbar_, e_, d_] := \frac{\hbar^2}{2 * e * d^2}
```

```
In[23]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 96]
```

EQ 97: $\frac{2\pi\alpha}{n*d}$

```
In[1]:= Clear[f]
In[2]:= f[\alpha_, n_, d_] := \frac{2\pi\alpha}{n*d}
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 97]
```

EQ 98: $\beta^*(1+\alpha^*\cos[\theta])$

```
In[1]:= Clear[f]
In[2]:= f[\beta_, \alpha_, \theta_] := \beta * (1 + \alpha * \Cos[\theta])
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}}, 98]
```

EQ 99: $\frac{-m*q^4}{2*(4\pi*\epsilon)^2\hbar^2} * \frac{1}{n^2}$

```
In[1]:= Clear[f]
In[2]:= f[m_, q_, \epsilon_, \hbar_, n_] := \frac{-m*q^4}{2*(4\pi*\epsilon)^2\hbar^2} * \frac{1}{n^2}
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}, {1, 5}}, 99]
```

EQ 100: $\frac{-p*q*A}{m}$

```
In[1]:= Clear[f]
In[2]:= f[p_, q_, A_, m_] := \frac{-p*q*A}{m}
In[3]:= GenerateData[f, {{1, 5}, {1, 5}, {1, 5}, {1, 5}}, 100]
```