APPENDIX FOR "CHATSR: CONVERSATIONAL SYMBOLIC REGRESSION"

A APPENDIX: DETAILED SETTINGS OF HYPERPARAMETERS DURING TRAINING THE SETTRANSFORMER.

Table 3: Hyperparameters of SetTransformer

hyperparameters	Numerical value
N_p	0
activation	'relu'
bit16	True
dec_layers	5
dec_pf_dim	512
dim_hidden	512
dim_input	3
dropout	0
input_normalization	False
length_eq	60
linear	False
ln	True
lr	0.0001
mean	0.5
n_l_enc	5
norm	True
num_features	20
num_heads	8
num_inds	50
output_dim	60
sinuisodal_embeddings	False
src_pad_idx	0
std	0.5
trg_pad_idx	0

B Appendix: Details of the expressions for the various properties involved in the Zero-shot experiment

To test ChatSR's Zero-shot capability, we designed some properties not included in the training dataset for testing. They include Continuous Monotonic Decreasing, Continuous Globally Monotonically Increasing, Origin-Centered Symmetric, Continuous Convex and Continuous Concave are the five properties. For each property, 10 functions satisfying this property are designed. The form of the function is as follows Table 4,5,6,7,8.

Function Index	Expression	Domain
1	$f(x) = -x - \ln(x+1)$	$x \geq 0$
2	$f(x) = e^{-x} - x^2$	$\mathbb{R}$
3	$f(x) = \frac{1}{x+1} - \sqrt{x}$	$x > 0$
4	$f(x) = 10 - x^2 - \arctan(x)$	$\mathbb{R}$
5	$f(x) = \frac{1}{\sqrt{x+1}} - \ln(x+2)$	$x \geq 0$
6	$f(x) = e^{-x}\cos(x) + \frac{1}{x+1}$	$x > 0$
7	$f(x) = -\ln(x+1) + x^{-0.5}$	$x > 0$
8	$f(x) = \sqrt{x+1} - 3\ln(x+2)$	$x \geq 0$
9	$f(x) = e^{-x^2} - x$	$\mathbb{R}$
10	$f(x) = -x^{3/2} - \tan^{-1}(x)$	$x \geq 0$

Table 4: List of Continuous Monotonic Decreasing Functions

Function Index	Expression	Domain
1	$f(x) = x + \ln(x^2+1)$	$\mathbb{R}$
2	$f(x) = e^x + x^2$	$\mathbb{R}$
3	$f(x) = x + \arctan(x)$	$\mathbb{R}$
4	$f(x) = x\sqrt{x^2+1}$	$\mathbb{R}$
5	$f(x) = x^3 + 3x$	$\mathbb{R}$
6	$f(x) = x + \sqrt{x+2} + \ln(x^2+1)$	$x \geq -2$
7	$f(x) = e^x + \ln(x^2+1)$	$\mathbb{R}$
8	$f(x) = \sqrt{x^2+1} + x^3$	$\mathbb{R}$
9	$f(x) = x + \arcsin(\tanh(x))$	$\mathbb{R}$
10	$f(x) = \ln(x+2) + e^x$	$x > -2$

Table 5: List of Continuous Globally Monotonically Increasing Functions

Function Index	Expressions	Domain
1	$f(x) = x\sin(x)$	$x \in \mathbb{R}$
2	$f(x) = 3x^3 - 2x$	$x \in \mathbb{R}$
3	$f(x) = \log(1+x) - \log(1-x)$	$x \in (-1, 1)$
4	$f(x) = e^x - e^{-x}$	$x \in \mathbb{R}$
5	$f(x) = \arctan(x) - \arctan(-x)$	$x \in \mathbb{R}$
6	$f(x) = x(x^2+3)$	$x \in \mathbb{R}$
7	$f(x) = x^5 - 10x^3 + 9x$	$x \in \mathbb{R}$
8	$f(x) = \sinh(x) = \frac{e^x - e^{-x}}{2}$	$x \in \mathbb{R}$
9	$f(x) = 7x - x^7$	$x \in \mathbb{R}$
10	$f(x) = x\cos(x) + \sin(x)$	$x \in \mathbb{R}$

Table 6: Expressions that are Origin-Centered Symmetric (Odd Functions)

Function Index	Expression	Domain
1	$f(x) = x^4 + 2x^2 + 1$	$x \in \mathbb{R}$
2	$f(x) = e^x + x^2$	$\mathbb{R}$
3	$f(x) = x^2 + \log(1+e^x)$	$x \in \mathbb{R}$
4	$f(x) = x\sinh(x) + \cosh(x)$	$x \in \mathbb{R}$
5	$f(x) = x^2 + \sqrt{x^2+1}$	$x \in \mathbb{R}$
6	$f(x) = e^{x^2} - x$	$x \in \mathbb{R}$
7	$f(x) = x^2 + \arctan(x)$	$x \in \mathbb{R}$
8	$f(x) = \sqrt{1+e^x}$	$x \in \mathbb{R}$
9	$f(x) = x + \log(1+x^2)$	$x \in \mathbb{R}$
10	$f(x) = x^6 + x^4 - x^3 + x + e^{-x}$	$x \in \mathbb{R}$

Table 7: List of Continuous Convex Functions

Function Index	Expression	Domain
1	$f(x) = -x^4 + 2x^2 + 1$	$x \in \mathbb{R}$
2	$f(x) = -e^x + 3x - 2$	$x \in \mathbb{R}$
3	$f(x) = -x^2 + \log(1+x^2)$	$x \in \mathbb{R}$
4	$f(x) = -\cosh(x)$	$x \in \mathbb{R}$
5	$f(x) = -x^2 - \sqrt{x^2+1}$	$x \in \mathbb{R}$
6	$f(x) = -e^{x/2} - x^2$	$x \in \mathbb{R}$
7	$f(x) = \log(1+e^{-x})$	$x \in \mathbb{R}$
8	$f(x) = -\sqrt{1+x^2}$	$x \in \mathbb{R}$
9	$f(x) = -\log(x^2+1)$	$x \in \mathbb{R}$
10	$f(x) = -x^6 - x^4 + x^3 - x + e^{-x^2}$	$x \in \mathbb{R}$

Table 8: List of Continuous Concave Functions

C APPENDIX: TEST DATASET IN DETAIL

Table 9,10,11 shows in detail the expression forms of the data set used in the experiment, as well as the sampling range and sampling number. Some specific presentation rules are described below

- The variables contained in the regression task are represented as $[x_1, x_2, ..., x_n]$.

- $U(a, b, c)$ signifies c random points uniformly sampled between a and b for each input variable. Different random seeds are used for training and testing datasets.
- $E(a, b, c)$ indicates c points evenly spaced between a and b for each input variable.

Name	Expression	Dataset
Nguyen-1	$x_1^3 + x_1^2 + x_1$	U$(-1, 1, 20)$
Nguyen-2	$x_1^4 + x_1^3 + x_1^2 + x_1$	U$(-1, 1, 20)$
Nguyen-3	$x_1^5 + x_1^4 + x_1^3 + x_1^2 + x_1$	U$(-1, 1, 20)$
Nguyen-4	$x_1^6 + x_1^5 + x_1^4 + x_1^3 + x_1^2 + x_1$	U$(-1, 1, 20)$
Nguyen-5	$\sin(x_1^2)\cos(x_1) - 1$	U$(-1, 1, 20)$
Nguyen-6	$\sin(x_1) + \sin(x_1 + x_1^2)$	U$(-1, 1, 20)$
Nguyen-7	$\log(x_1 + 1) + \log(x_1^2 + 1)$	U$(0, 2, 20)$
Nguyen-8	$\sqrt{x_1}$	U$(0, 4, 20)$
Nguyen-9	$\sin(x_1) + \sin(x_2^2)$	U$(0, 1, 20)$
Nguyen-10	$2\sin(x_1)\cos(x_2)$	U$(0, 1, 20)$
Nguyen-11	$x_1^{x_2}$	U$(0, 1, 20)$
Nguyen-12	$x_1^4 - x_1^3 + \frac{1}{2}x_2^2 - x_2$	U$(0, 1, 20)$
Nguyen-2′	$4x_1^4 + 3x_1^3 + 2x_1^2 + x_1$	U$(-1, 1, 20)$
Nguyen-5′	$\sin(x_1^2)\cos(x_1) - 2$	U$(-1, 1, 20)$
Nguyen-8′	$\sqrt[3]{x_1}$	U$(0, 4, 20)$
Nguyen-8′′	$\sqrt[3]{x_1^2}$	U$(0, 4, 20)$
Nguyen-1^c	$3.39x_1^3 + 2.12x_1^2 + 1.78x$	U$(-1, 1, 20)$
Nguyen-5^c	$\sin(x_1^2)\cos(x) - 0.75$	$U(-1, 1, 20)$
Nguyen-7^c	$\log(x + 1.4) + \log(x_1^2 + 1.3)$	U$(0, 2, 20)$
Nguyen-8^c	$\sqrt{1.23x}$	U$(0, 4, 20)$
Nguyen-10^c	$\sin(1.5x)\cos(0.5x_2)$	U$(0, 1, 20)$
Korns-1	$1.57 + 24.3 * x_1^4$	U$(-1, 1, 20)$
Korns-2	$0.23 + 14.2\frac{(x_4+x_1)}{(3x_2)}$	U$(-1, 1, 20)$
Korns-3	$4.9\frac{(x_2-x_1+\frac{x_1}{x_3}}{(3x_3))} - 5.41$	U$(-1, 1, 20)$
Korns-4	$0.13sin(x_1) - 2.3$	U$(-1, 1, 20)$
Korns-5	$3 + 2.13log(\|x_5\|)$	U$(-1, 1, 20)$
Korns-6	$1.3 + 0.13\sqrt{\|x_1\|}$	U$(-1, 1, 20)$
Korns-7	$2.1(1 - e^{-0.55x_1})$	U$(-1, 1, 20)$
Korns-8	$6.87 + 11\sqrt{\|7.23x_1x_4x_5\|}$	U$(-1, 1, 20)$
Korns-9	$12\sqrt{\|4.2x_1x_2x_2\|}$	U$(-1, 1, 20)$
Korns-10	$0.81 + 24.3\frac{2x_1+3x_2^2}{4x_3^3+5x_4^4}$	U$(-1, 1, 20)$
Korns-11	$6.87 + 11cos(7.23x_1^3)$	U$(-1, 1, 20)$
Korns-12	$2 - 2.1cos(9.8x_1^3)sin(1.3x_5)$	U$(-1, 1, 20)$
Korns-13	$32.0 - 3.0\frac{tan(x_1)}{tan(x_2)}\frac{tan(x_3)}{tan(x_4)}$	U$(-1, 1, 20)$
Korns-14	$22.0 - (4.2cos(x_1) - tan(x_2))\frac{tanh(x_3)}{sin(x_4)}$	U$(-1, 1, 20)$
Korns-15	$12.0 - \frac{6.0tan(x_1)}{e^{x_2}}(log(x_3) - tan(x_4))))$	U$(-1, 1, 20)$
Jin-1	$2.5x_1^4 - 1.3x_1^3 + 0.5x_2^2 - 1.7x_2$	U$(-3, 3, 100)$
Jin-2	$8.0x_1^2 + 8.0x_2^3 - 15.0$	U$(-3, 3, 100)$
Jin-3	$0.2x_1^3 + 0.5x_2^3 - 1.2x_2 - 0.5x_1$	U$(-3, 3, 100)$
Jin-4	$1.5\exp x + 5.0cos(x_2)$	U$(-3, 3, 100)$
Jin-5	$6.0sin(x_1)cos(x_2)$	U$(-3, 3, 100)$
Jin-6	$1.35x_1x_2 + 5.5sin((x_1 - 1.0)(x_2 - 1.0))$	U$(-3, 3, 100)$

Table 9: Specific formula form and value range of the three data sets Nguyen, Korns, and Jin.

Name	Expression	Dataset
Neat-1	$x_1^4 + x_1^3 + x_1^2 + x$	$\mathrm{U}(-1, 1, 20)$
Neat-2	$x_1^5 + x_1^4 + x_1^3 + x_1^2 + x$	$\mathrm{U}(-1, 1, 20)$
Neat-3	$\sin(x_1^2)\cos(x) - 1$	$\mathrm{U}(-1, 1, 20)$
Neat-4	$\log(x+1) + \log(x_1^2 + 1)$	$\mathrm{U}(0, 2, 20)$
Neat-5	$2\sin(x)\cos(x_2)$	$\mathrm{U}(-1, 1, 100)$
Neat-6	$\sum_{k=1}^{x} \frac{1}{k}$	$\mathrm{E}(1, 50, 50)$
Neat-7	$2 - 2.1\cos(9.8x_1)\sin(1.3x_2)$	$\mathrm{E}(-50, 50, 10^5)$
Neat-8	$\frac{e^{-(x_1)^2}}{1.2+(x_2-2.5)^2}$	$\mathrm{U}(0.3, 4, 100)$
Neat-9	$\frac{1}{1+x_1^{-4}} + \frac{1}{1+x_2^{-4}}$	$\mathrm{E}(-5, 5, 21)$
Keijzer-1	$0.3x_1 sin(2\pi x_1)$	$\mathrm{U}(-1, 1, 20)$
Keijzer-2	$2.0x_1 sin(0.5\pi x_1)$	$\mathrm{U}(-1, 1, 20)$
Keijzer-3	$0.92x_1 sin(2.41\pi x_1)$	$\mathrm{U}(-1, 1, 20)$
Keijzer-4	$x_1^3 e^{-x_1} cos(x_1) sin(x_1) sin(x_1)^2 cos(x_1) - 1$	$\mathrm{U}(-1, 1, 20)$
Keijzer-5	$3 + 2.13 log(\|x_5\|)$	$\mathrm{U}(-1, 1, 20)$
Keijzer-6	$\frac{x1(x1+1)}{2}$	$\mathrm{U}(-1, 1, 20)$
Keijzer-7	$log(x_1)$	$\mathrm{U}(0, 1, 20)$
Keijzer-8	$\sqrt{(x_1)}$	$\mathrm{U}(0, 1, 20)$
Keijzer-9	$log(x_1 + \sqrt{x_1^2 + 1})$	$\mathrm{U}(-1, 1, 20)$
Keijzer-10	$x_1^{x_2}$	$\mathrm{U}(-1, 1, 20)$
Keijzer-11	$x_1 x_2 + sin((x_1 - 1)(x_2 - 1))$	$\mathrm{U}(-1, 1, 20)$
Keijzer-12	$x_1^4 - x_1^3 + \frac{x_2^2}{2} - x_2$	$\mathrm{U}(-1, 1, 20)$
Keijzer-13	$6sin(x_1)cos(x_2)$	$\mathrm{U}(-1, 1, 20)$
Keijzer-14	$\frac{8}{2+x_1^2+x_2^2}$	$\mathrm{U}(-1, 1, 20)$
Keijzer-15	$\frac{x_1^3}{5} + \frac{x_2^3}{2} - x_2 - x_1$	$\mathrm{U}(-1, 1, 20)$
Livermore-1	$\frac{1}{3} + x_1 + sin(x_1^2))$	$\mathrm{U}(-3, 3, 100)$
Livermore-2	$sin(x_1^2) * cos(x1) - 2$	$\mathrm{U}(-3, 3, 100)$
Livermore-3	$sin(x_1^3) * cos(x_1^2)) - 1$	$\mathrm{U}(-3, 3, 100)$
Livermore-4	$log(x_1 + 1) + log(x_1^2 + 1) + log(x_1)$	$\mathrm{U}(-3, 3, 100)$
Livermore-5	$x_1^4 - x_1^3 + x_2^2 - x_2$	$\mathrm{U}(-3, 3, 100)$
Livermore-6	$4x_1^4 + 3x_1^3 + 2x_1^2 + x_1$	$\mathrm{U}(-3, 3, 100)$
Livermore-7	$\frac{(exp(x1) - exp(-x_1)}{2})$	$\mathrm{U}(-1, 1, 100)$
Livermore-8	$\frac{(exp(x1) + exp(-x1)}{3}$	$\mathrm{U}(-3, 3, 100)$
Livermore-9	$x_1^9 + x_1^8 + x_1^7 + x_1^6 + x_1^5 + x_1^4 + x_1^3 + x_1^2 + x_1$	$\mathrm{U}(-1, 1, 100)$
Livermore-10	$6 * sin(x_1)cos(x_2)$	$\mathrm{U}(-3, 3, 100)$
Livermore-11	$\frac{x_1^2 x_2^2}{(x_1+x_2)}$	$\mathrm{U}(-3, 3, 100)$
Livermore-12	$\frac{x_1^5}{x_2^3}$	$\mathrm{U}(-3, 3, 100)$
Livermore-13	$x_1^{\frac{1}{3}}$	$\mathrm{U}(-3, 3, 100)$
Livermore-14	$x_1^3 + x_1^2 + x_1 + sin(x_1) + sin(x_2^2)$	$\mathrm{U}(-1, 1, 100)$
Livermore-15	$x_1^{\frac{1}{5}}$	$\mathrm{U}(-3, 3, 100)$
Livermore-16	$x_1^{\frac{2}{3}}$	$\mathrm{U}(-3, 3, 100)$
Livermore-17	$4sin(x_1)cos(x_2)$	$\mathrm{U}(-3, 3, 100)$
Livermore-18	$sin(x_1^2) * cos(x_1) - 5$	$\mathrm{U}(-3, 3, 100)$
Livermore-19	$x_1^5 + x_1^4 + x_1^2 + x_1$	$\mathrm{U}(-3, 3, 100)$
Livermore-20	$e^{(-x_1^2)}$	$\mathrm{U}(-3, 3, 100)$
Livermore-21	$x_1^8 + x_1^7 + x_1^6 + x_1^5 + x_1^4 + x_1^3 + x_1^2 + x_1$	$\mathrm{U}(-1, 1, 20)$
Livermore-22	$e^{(-0.5x_1^2)}$	$\mathrm{U}(-3, 3, 100)$

Table 10: Specific formula form and value range of the three data sets neat, Keijzer, and Livermore.

Name	Expression	Dataset
Vladislavleva-1	$\frac{(e^{-(x1-1)^2})}{(1.2+(x2-2.5)^2))}$	$\mathrm{U}(-1, 1, 20)$
Vladislavleva-2	$e^{-x_1} x_1^3 cos(x_1) sin(x_1)(cos(x_1) sin(x_1)^2 - 1)$	$\mathrm{U}(-1, 1, 20)$
Vladislavleva-3	$e^{-x_1} x_1^3 cos(x_1) sin(x_1)(cos(x_1) sin(x_1)^2 - 1)(x_2 - 5)$	$\mathrm{U}(-1, 1, 20)$
Vladislavleva-4	$\frac{10}{5+(x1-3)^2+(x_2-3)^2+(x_3-3)^2+(x_4-3)^2+(x_5-3)^2}$	$\mathrm{U}(0, 2, 20)$
Vladislavleva-5	$30(x_1 - 1)\frac{x_3-1}{(x_1-10)} x_2^2$	$\mathrm{U}(-1, 1, 100)$
Vladislavleva-6	$6sin(x_1)cos(x_2)$	$\mathrm{E}(1, 50, 50)$
Vladislavleva-7	$2 - 2.1\cos(9.8x)\sin(1.3x_2)$	$\mathrm{E}(-50, 50, 10^5)$
Vladislavleva-8	$\frac{e^{-(x-1)^2}}{1.2+(x_2-2.5)^2}$	$\mathrm{U}(0.3, 4, 100)$
Test-2	$3.14x_1^2$	$\mathrm{U}(-1, 1, 20)$
Const-Test-1	$5x_1^2$	$\mathrm{U}(-1, 1, 20)$
GrammarVAE-1	$1/3 + x1 + sin(x_1^2))$	$\mathrm{U}(-1, 1, 20)$
Sine	$sin(x_1) + sin(x_1 + x_1^2))$	$\mathrm{U}(-1, 1, 20)$
Nonic	$x_1^9 + x_1^8 + x_1^7 + x_1^6 + x_1^5 + x_1^4 + x_1^3 + x_1^2 + x_1$	$\mathrm{U}(-1, 1, 100)$
Pagie-1	$\frac{1}{1+x_1^{-4}+\frac{1}{1+x2^{-4}}}$	$\mathrm{E}(1, 50, 50)$
Meier-3	$\frac{x_1^2 x_2^2}{(x_1+x_2)}$	$\mathrm{E}(-50, 50, 10^5)$
Meier-4	$\frac{x_1^5}{x_2^3}$	$U(0.3, 4, 100)$
Poly-10	$x_1 x_2 + x_3 x4 + x_5 x_6 + x_1 x_7 x_9 + x_3 x_6 x_{10}$	$\mathrm{E}(-1, 1, 100)$
Constant-1	$3.39 * x_1^3 + 2.12 * x_1^2 + 1.78 * x_1$	$U(-4, 4, 100)$
Constant-2	$sin(x_1^2) * cos(x_1) - 0.75$	$U(-4, 4, 100)$
Constant-3	$sin(1.5 * x_1) * cos(0.5 * x_2)$	$U(0.1, 4, 100)$
Constant-4	$2.7 * x_1^{x_2}$	$U(0.3, 4, 100)$
Constant-5	$sqrt(1.23 * x_1)$	$U(0.1, 4, 100)$
Constant-6	$x_1^{0.426}$	$U(0.0, 4, 100)$
Constant-7	$2 * sin(1.3 * x_1) * cos(x_2)$	$U(-4, 4, 100)$
Constant-8	$log(x_1 + 1.4) + log(x1, 2 + 1.3)$	$U(-4, 4, 100)$
R1	$\frac{(x_1+1)^3}{x_1^2-x_1+1)}$	$U(-5, 5, 100)$
R2	$\frac{(x_1^2-3*x_1^2+1}{x_1^2+1)}$	$U(-4, 4, 100)$
R3	$\frac{x_1^6+x_1^5)}{(x_1^4+x_1^3+x_1^2+x1+1)}$	$U(-4, 4, 100)$

Table 11: Specific formula form and value range of the three data sets Vladislavleva and others.

D Appendix: ChatSR tests on AIFeynman dataset.

In our study, we conducted an evaluation of our novel symbol regression algorithm, termed ChatSR, leveraging the AI Feynman dataset, which comprises a diverse array of problems spanning various subfields of physics and mathematics, including mechanics, thermodynamics, and electromagnetism. Originally, the dataset contained 100,000 data points; however, for a more rigorous assessment of ChatSR's efficacy, our analysis was deliberately confined to a subset of 100 data points. Through the application of ChatSR for symbol regression on these selected data points, we meticulously calculated the R^2 values to compare the algorithm's predictions against the true solutions.

The empirical results from our investigation unequivocally affirm that ChatSR possesses an exceptional ability to discern the underlying mathematical expressions from a constrained sample size. Notably, the R^2 values achieved were above 0.99 for a predominant portion of the equations, underscoring the algorithm's remarkable accuracy in fitting these expressions. These findings decisively position ChatSR as a potent tool for addressing complex problems within the domains of physics and mathematics. The broader implications of our study suggest that ChatSR holds considerable promise for a wide range of applications across different fields. Detailed experimental results are presented in Table 12 and Table 13.

Feynman	Equation	R^2
I.6.20a	$f = e^{-\theta^2/2}/\sqrt{2\pi}$	0.9989
I.6.20	$f = e^{-\frac{\theta^2}{2\sigma^2}}/\sqrt{2\pi\sigma^2}$	0.9973
I.6.20b	$f = e^{-\frac{(\theta-\theta_1)^2}{2\sigma^2}}/\sqrt{2\pi\sigma^2}$	0.9421
I.8.14	$d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$	0.9413
I.9.18	$F = \frac{Gm_1m_2}{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$	0.9835
I.10.7	$F = \frac{Gm_1m_2}{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$	0.9724
I.11.19	$A = x_1y_1 + x_2y_2 + x_3y_3$	0.9891
I.12.1	$F = \mu N_n$	0.9956
I.12.2	$F = \frac{q_1q_2}{4\pi\epsilon r^2}$	0.9999
I.12.4	$E_f = \frac{q_1}{4\pi\epsilon r^2}$	0.9939
I.12.5	$F = q_2E_f$	0.9999
I.12.11	$F = \mathcal{Q}(E_f + Bv\sin\theta)$	0.9983
I.13.4	$K = \frac{1}{2}m(v^2+u^2+w^2)$	0.9913
I.13.12	$U = Gm_1m_2(\frac{1}{r_2}-\frac{1}{r_1})$	0.9859
I.14.3	$U = mgz$	1.0
I.14.4	$U = \frac{k_{spring}x^2}{2}$	0.9926
I.15.3x	$x_1 = \frac{x-ut}{\sqrt{1-u^2/c^2}}$	0.9828
I.15.3t	$t_1 = \frac{t-ux/c^2}{\sqrt{1-u^2/c^2}}$	0.9732
I.15.10	$p = \frac{m_0v}{\sqrt{1-v^2/c^2}}$	0.9810
I.16.6	$v_1 = \frac{u+v}{1+uv/c^2}$	0.9984
I.18.4	$r = \frac{m_1r_1+m_2r_2}{m_1+m_2}$	0.9818
I.18.12	$\tau = rF\sin\theta$	0.9928
I.18.16	$L = mrv\sin\theta$	0.9993
I.24.6	$E = \frac{1}{4}m(\omega^2+\omega_0^2)x^2$	0.9981
I.25.13	$V_e = \frac{q}{C}$	1.0
I.26.2	$\theta_1 = \arcsin(n\sin\theta_2)$	0.9992
I.27.6	$f_f = \frac{1}{\frac{1}{d_1}+\frac{n}{d_2}}$	0.9914
I.29.4	$k = \frac{\omega}{c}$	1.0
I.29.16	$x = \sqrt{x_1^2+x_2^2-2x_1x_2\cos(\theta_1-\theta_2)}$	0.9827
I.30.3	$I_* = I_{*0}\frac{\sin^2(n\theta/2)}{\sin^2(\theta/2)}$	0.9937
I.30.5	$\theta = \arcsin(\frac{\lambda}{nd})$	0.9917
I.32.5	$P = \frac{q^2a^2}{6\pi\epsilon c^3}$	0.9933
I.32.17	$P = (\frac{1}{2}\epsilon cE_f^2)(8\pi r^2/3)(\omega^4/(\omega^2-\omega_0^2)^2)$	0.991
I.34.8	$\omega = \frac{qvB}{p}$	0.9999
I.34.10	$\omega = \frac{\omega_0}{1-v/c}$	0.9913
I.34.14	$\omega = \frac{1+v/c}{\sqrt{1-v^2/c^2}}\omega_0$	0.9918
I.34.27	$E = \hbar\omega$	0.9972
I.37.4	$I_* = I_1 + I_2 + 2\sqrt{I_1I_2}\cos\delta$	0.9827
I.38.12	$r = \frac{4\pi\epsilon\hbar^2}{mq^2}$	0.9983
I.39.10	$E = \frac{3}{2}p_FV$	0.9965
I.39.11	$E = \frac{1}{\gamma-1}p_FV$	0.9792
I.39.22	$P_F = \frac{nk_bT}{V}$	0.9935
I.40.1	$n = n_0e^{-\frac{mgx}{k_bT}}$	0.9799
I.41.16	$L_{rad} = \frac{\hbar\omega^3}{\pi^2c^2(e^{\frac{\hbar\omega}{k_bT}}-1)}$	0.9983
I.43.16	$v = \frac{\mu_{drift}qV_e}{d}$	0.9981
I.43.31	$D = \mu_ek_bT$	1.0
I.43.43	$\kappa = \frac{1}{\gamma-1}\frac{k_bv}{A}$	0.9347
I.44.4	$E = nk_bT\ln(\frac{V_2}{V_1})$	0.9024
I.47.23	$c = \sqrt{\frac{\gamma pr}{\rho}}$	0.9724
I.48.20	$E = \frac{mc^2}{\sqrt{1-v^2/c^2}}$	0.8902
I.50.26	$x = x_1[\cos(\omega t)+\alpha\, cos(\omega t)^2]$	0.9999

Table 12: Tested Feynman Equations, part 1.

Feynman	Equation	R^2
II.2.42	$\mathrm{P} = \frac{\kappa(T_2-T_1)A}{d}$	0.8824
II.3.24	$F_E = \frac{P}{4\pi r^2}$	0.9820
II.4.23	$V_e = \frac{q}{4\pi\epsilon r}$	0.9888
II.6.11	$V_e = \frac{1}{4\pi\epsilon}\frac{p_d\cos\theta}{r^2}$	0.9837
II.6.15a	$E_f = \frac{3}{4\pi\epsilon}\frac{p_d z}{r^5}\sqrt{x^2+y^2}$	0.9235
II.6.15b	$E_f = \frac{3}{4\pi\epsilon}\frac{p_d}{r^3}\cos\theta\sin\theta$	0.9928
II.8.7	$E = \frac{3}{5}\frac{q^2}{4\pi\epsilon d}$	0.9827
II.8.31	$E_{den} = \frac{\epsilon E_f^2}{2}$	0.9999
II.10.9	$E_f = \frac{\sigma_{den}}{\epsilon}\frac{1}{1+\chi}$	0.9933
II.11.3	$x = \frac{qE_f}{m(\omega_0^2-\omega^2)}$	0.9918
II.11.7	$n = n_0(1+\frac{p_d E_f\cos\theta}{k_b T})$	0.8927
II.11.20	$P_* = \frac{n_\rho p_d^2 E_f}{3k_b T}$	0.8355
II.11.27	$P_* = \frac{n\alpha}{1-n\alpha/3}\epsilon E_f$	0.9925
II.11.28	$\theta = 1+\frac{n\alpha}{1-(n\alpha/3)}$	0.9992
II.13.17	$B = \frac{1}{4\pi\epsilon c^2}\frac{2I}{r}$	0.9993
II.13.23	$\rho_c = \frac{\rho_{c_0}}{\sqrt{1-v^2/c^2}}$	0.9902
II.13.34	$j = \frac{\rho_{c_0} v}{\sqrt{1-v^2/c^2}}$	0.9827
II.15.4	$E = -\mu_M B\cos\theta$	0.9997
II.15.5	$E = -p_d E_f\cos\theta$	0.9973
II.21.32	$V_e = \frac{q}{4\pi\epsilon r(1-v/c)}$	0.9910
II.24.17	$k = \sqrt{\frac{\omega^2}{c^2}-\frac{\pi^2}{d^2}}$	0.9837
II.27.16	$F_E = \epsilon c E_f^2$	0.9935
II.27.18	$E_{den} = \epsilon E_f^2$	0.9972
II.34.2a	$I = \frac{qv}{2\pi r}$	0.9980
II.34.2	$\mu_M = \frac{qvr}{2}$	0.9903
II.34.11	$\omega = \frac{g\_qB}{2m}$	0.9937
II.34.29a	$\mu_M = \frac{qh}{4\pi m}$	0.9938
II.34.29b	$E = \frac{g\_\mu_M B J_z}{\hbar}$	0.9037
II.35.18	$n = \frac{n_0}{\exp(\mu_m B/(k_b T))+\exp(-\mu_m B/(k_b T))}$	0.9738
II.35.21	$M = n_\rho\mu_M\tanh(\frac{\mu_M B}{k_b T})$	0.8537
II.36.38	$f = \frac{\mu_m B}{k_b T}+\frac{\mu_m\alpha M}{\epsilon c^2 k_b T}$	0.9928
II.37.1	$E = \mu_M(1+\chi)B$	0.9999
II.38.3	$F = \frac{YAx}{d}$	0.9985
II.38.14	$\mu_S = \frac{Y}{2(1+\sigma)}$	0.9988
III.4.32	$n = \frac{1}{e^{\frac{\hbar\omega}{k_b T}}-1}$	0.9903
III.4.33	$E = \frac{\hbar\omega}{e^{\frac{\hbar\omega}{k_b T}}-1}$	0.9984
III.7.38	$\omega = \frac{2\mu_M B}{\hbar}$	0.9973
III.8.54	$p_\gamma = \sin(\frac{Et}{\hbar})^2$	0.9973
III.9.52	$p_\gamma = \frac{p_d E_f t}{\hbar}\frac{\sin((\omega-\omega_0)t/2)^2}{((\omega-\omega_0)t/2)^2}$	0.8036
III.10.19	$E = \mu_M\sqrt{B_x^2+B_y^2+B_z^2}$	0.9935
III.12.43	$L = n\hbar$	0.9999
III.13.18	$v = \frac{2Ed^2k}{\hbar}$	0.9935
III.14.14	$I = I_0(e^{\frac{qV_e}{k_b T}}-1)$	0.9927
III.15.12	$E = 2U(1-\cos(kd))$	0.9993
III.15.14	$m = \frac{\hbar^2}{2Ed^2}$	0.9927
III.15.27	$k = \frac{2\pi\alpha}{nd}$	0.9999
III.17.37	$f = \beta(1+\alpha\cos\theta)$	0.9938
III.19.51	$E = \frac{-mq^4}{2(4\pi\epsilon)^2\hbar^2}\frac{1}{n^2}$	0.9974
III.21.20	$j = \frac{-\rho_{c_0} q A_{vec}}{m}$	0.8668

Table 13: Tested Feynman Equations, part 2.