1 Type $(2, 0)$ geometry

1.1 Datasets

Name: 20180608
Dimension: 20×20
Range g_2: $[-4 : -1.5]$ 51 values
Samples: 2200

Name: 20180610
Dimension: 25×25
Range g_2: $[-4 : -1.5]$ 51 values
Samples: 1152

Name: 20180611
Dimension: 30×30
Range g_2: $[-4 : -1.5]$ 51 values
Samples: 1152

1.2 Action monitoring in A and B modes

Figure: 2
Dataset: 20180608
Data analysis script: `20_ABaction_monitoring.py`
Gnuplot script:

```
plot "20180608_varG_ABaction.txt" u 1:2 w lines title "{/Symbol r
    }^2", "20180608_varG_ABaction.txt" u 1:3 w lines title "(TrAB)
    ^2", "20180608_varG_ABaction.txt" u 1:4 w lines title "TrA^2",
    "20180608_varG_ABaction.txt" u 1:5 w lines lt 3 dt 2 title "TrA
    ^3", "20180608_varG_ABaction.txt" u 1:6 w lines lt 3 dt 4 title
    "TrA^4", "20180608_varG_ABaction.txt" u 1:7 w lines lt 4 title "
    TrB^2", "20180608_varG_ABaction.txt" u 1:8 w lines lt 4 dt 2
    title "TrB^4", "20180608_varG_ABaction.txt" u 1:9 w lines lt 5
```

```
    title "TrA^2B^2", "20180608_varG_ABaction.txt" u 1:10 w lines lt
     6 title "TrABAB", "20180608_varG_ABaction.txt" u 1:11 w lines
    lt 7 title "TrB^2A"
```

1.3 Shift of ρ^2 from stationary solution

Figure: 1
Dataset: 20180608
Data analysis script: `20_soft_monitoring.py`
Gnuplot script:

```
plot "20180608_varG_ALL.txt" u 1:3 w lines title "1/N Tr W^+ W",
    "20180608_varG_ALL.txt" u 1:2 w lines title "1/N^2 |TrW|^2",
    "20180608_varG_ALL.txt" u 1:4 w lines title "1/N TrB^2",
    "20180608_varG_ALL.txt" u 1:5 w lines title "1/N TrA^2", -x/8 lt
     7 dt 2 title "-g/8"
```

1.4 Scaling of $\mathrm{Tr}\, B^2$ and $\mathrm{Tr}\, B^4$

Figure: 3
Dataset: 20180608, 20180610, 20180611
Data analysis script: `20_ABaction_monitoring.py`
Gnuplot script:

```
plot "20180608/20180608_varG_ABaction.txt" u 1:($8/20) w lines
    title "1/N TrB^4", "20180610/20180610_varG_ABaction.txt" u 1:($8
    /25) w lines notitle, "20180611/20180611_varG_ABaction.txt" u
    1:($8/30) w lines notitle, "20180608/20180608_varG_ABaction.txt"
     u 1:($7/20) w lines lt 1 dt 2 title "1/N TrB^2",
    "20180610/20180610_varG_ABaction.txt" u 1:($7/25) w lines lt 2
    dt 2 notitle, "20180611/20180611_varG_ABaction.txt" u 1:($7/30)
    w lines lt 3 dt 2 notitle
```

1.5 B modes matrix elements

Figure: 4, 5
Dataset: 20180608
Data analysis script: `20_Bexp_monitoring.py`
Gnuplot script:

```
set key font ",11"
plot "20180608_varG_B2exp.txt" u 1:2:3 w yerrorbars title "|B_{ii
    }|^2", "20180608_varG_B2exp.txt" u 1:4:5 w yerrorbars title "|B_
    {ij}|^2"

set key font ",11"
plot "20180608_varG_B4exp.txt" u 1:2:3 w yerrorbars title "|B_{ii
    }|^4", "20180608_varG_B4exp.txt" u 1:4:5 w yerrorbars title "|B_
    {ij}|^4"
```

Figure: 6
Dataset: 20180608
Data analysis script: `20_Bij_ik_l_monitoring.py`
Gnuplot script:

```
set key font ",11"
plot "20180608_varG_Bij_ik_l.txt" u 1:2:3 w yerrorbars title "E[ |
    B_{ij}|^2 |B_{il}|^2 ]", "20180608_varG_Bij_ik_l.txt" u 1:4:5 w
    yerrorbars title "E[ |B_{ij}|^2|B_{kl}|^2 ]"
```

Figure: 7
Dataset: 20180608
Data analysis script: `20_Bstatind_monitoring.py`
Gnuplot script:

```
set title font ",11"
set title "E[|B_{ij}|^2|B_{kl}|^2] - E[|B_{ij}|^2]E[|B_{kl}|^2]
plot "20180608_varG_Bstatind.txt" u 1:2:3 w yerrorbars notitle
```

Figure: 8
Dataset: 20180608
Data analysis script: 20_4Bexp_monitoring.py
Gnuplot script:

```
set title font ",11"
set key font ",11"
set key left bottom
set title "E[ B_{kl} B_{lm} B_{mn} B_{nk} ] with m != k and n != l"
plot "20180608_varG_4Bexp.txt" u 1:2:3 w yerrorbars title "real
    part", "20180608_varG_4Bexp.txt" u 1:4:5 w yerrorbars title "
    imaginary part"
```

1.6 Plots

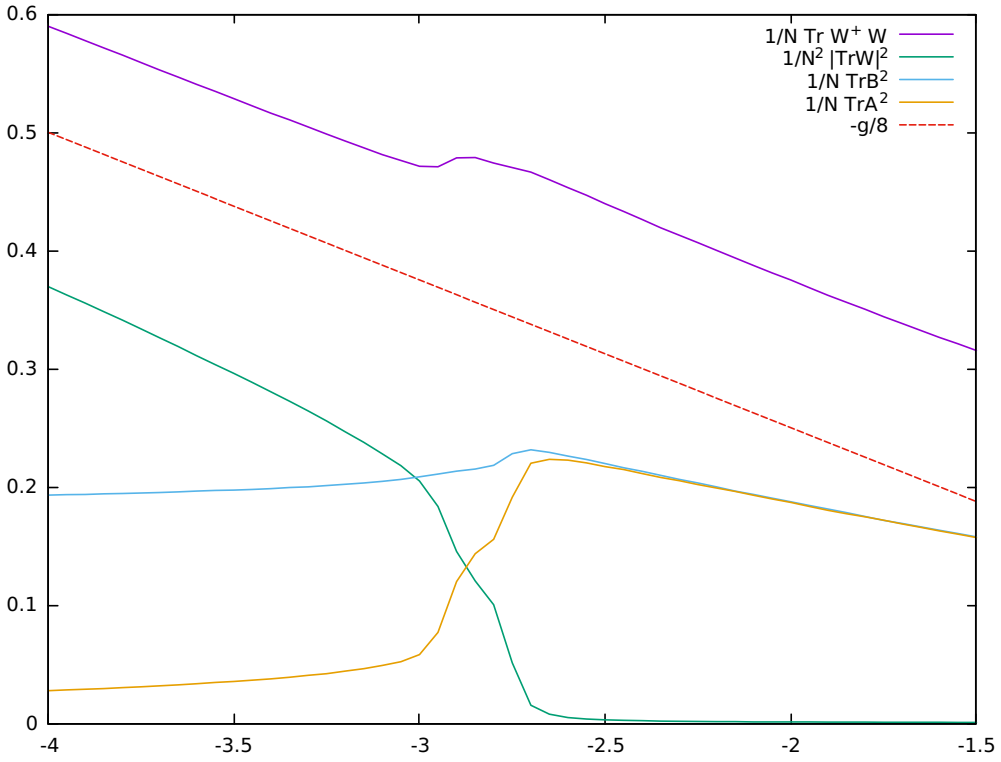

Figure 1: Shift of ρ^2 (green line) from stationary solution (red dashed line). Matrix size 20x20.

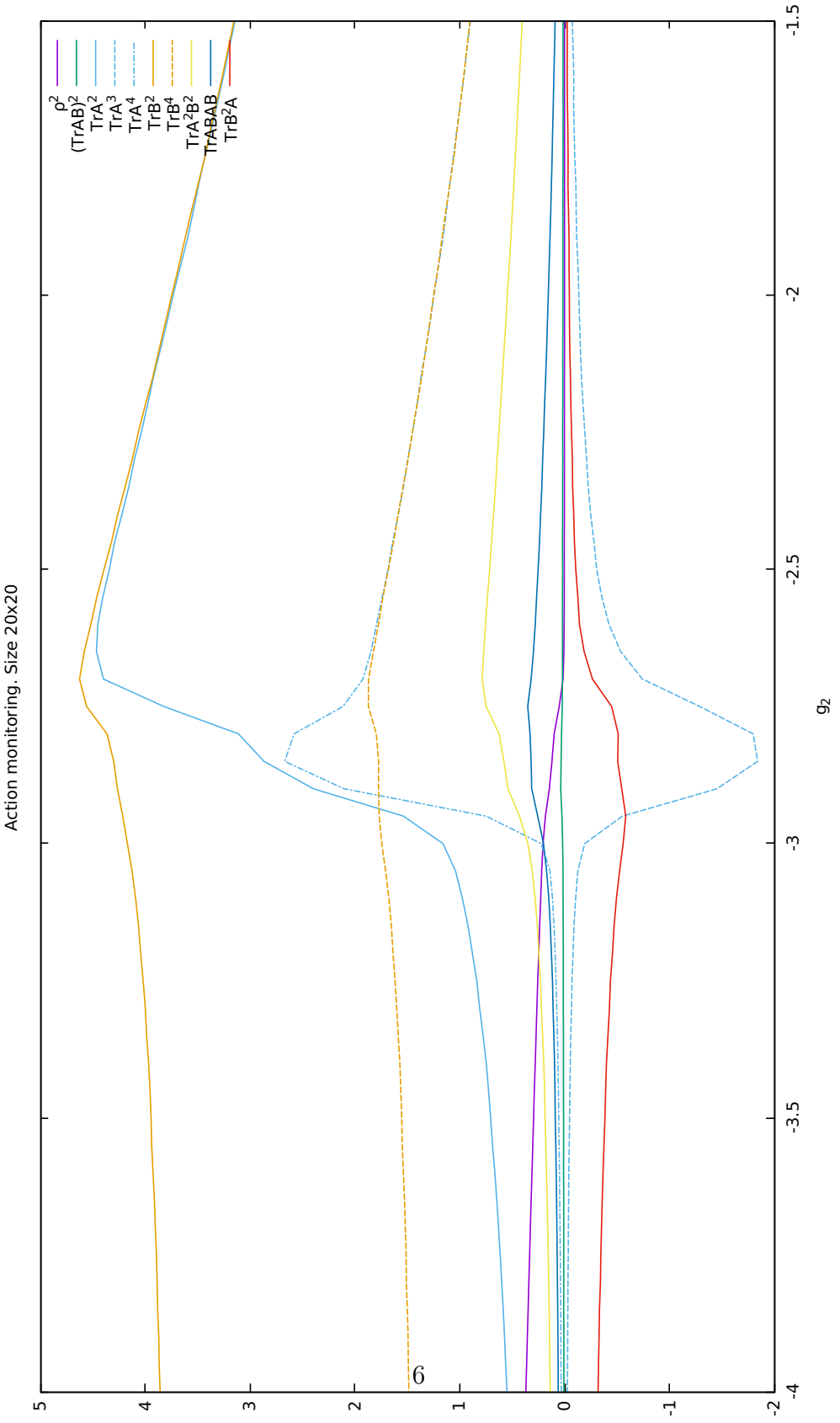

Figure 2: Monitoring of A and B modes in the action for matrix size 20x20. Dataset: 20180608

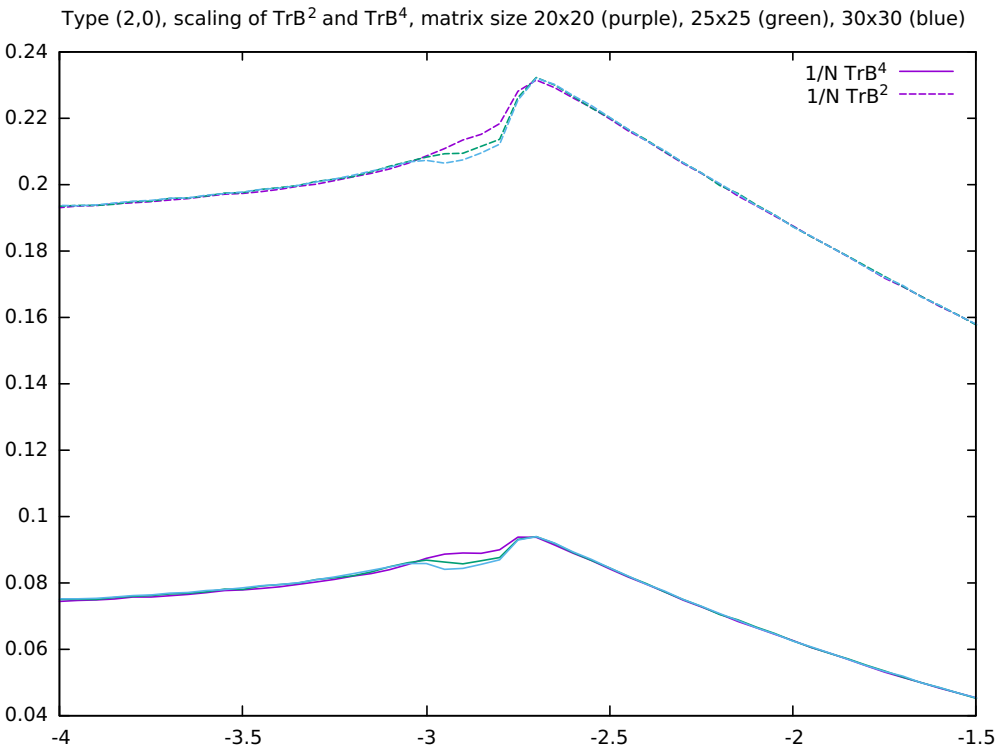

Figure 3: Scaling of $\mathrm{Tr}\, B^2$ and $\mathrm{Tr}\, B^4$. Both quantities scale like N.

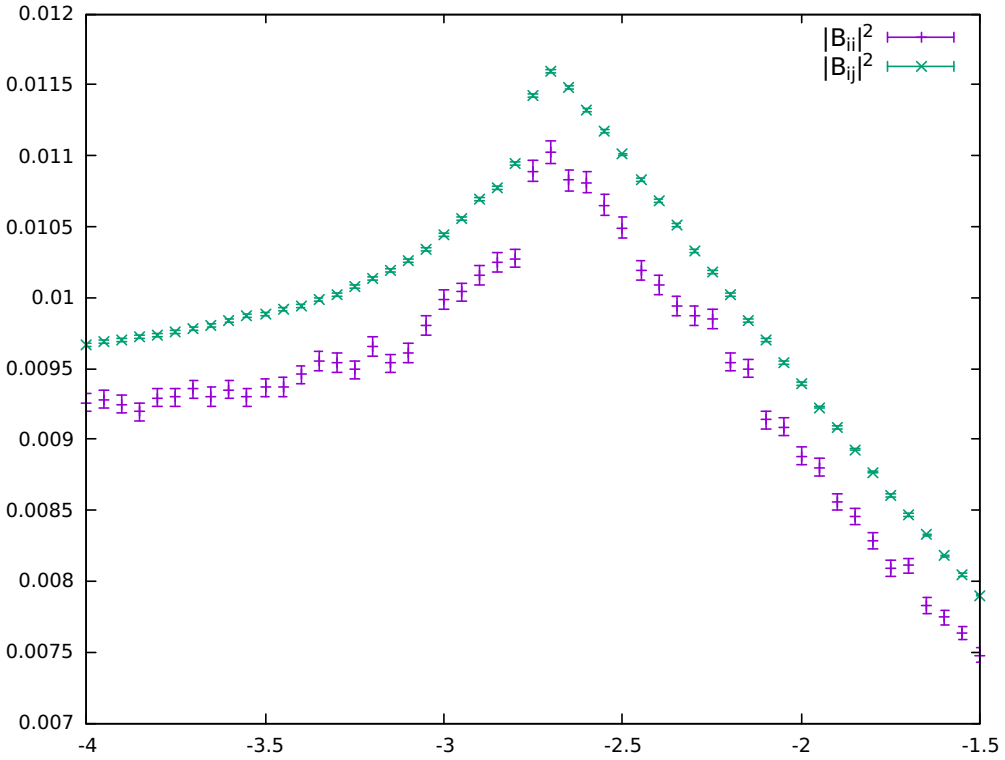

Figure 4: Expectation value of $|B_{ii}|^2$ (purple) and $|B_{ij}|^2$ (green) versus g_2. Matrix size 20x20.

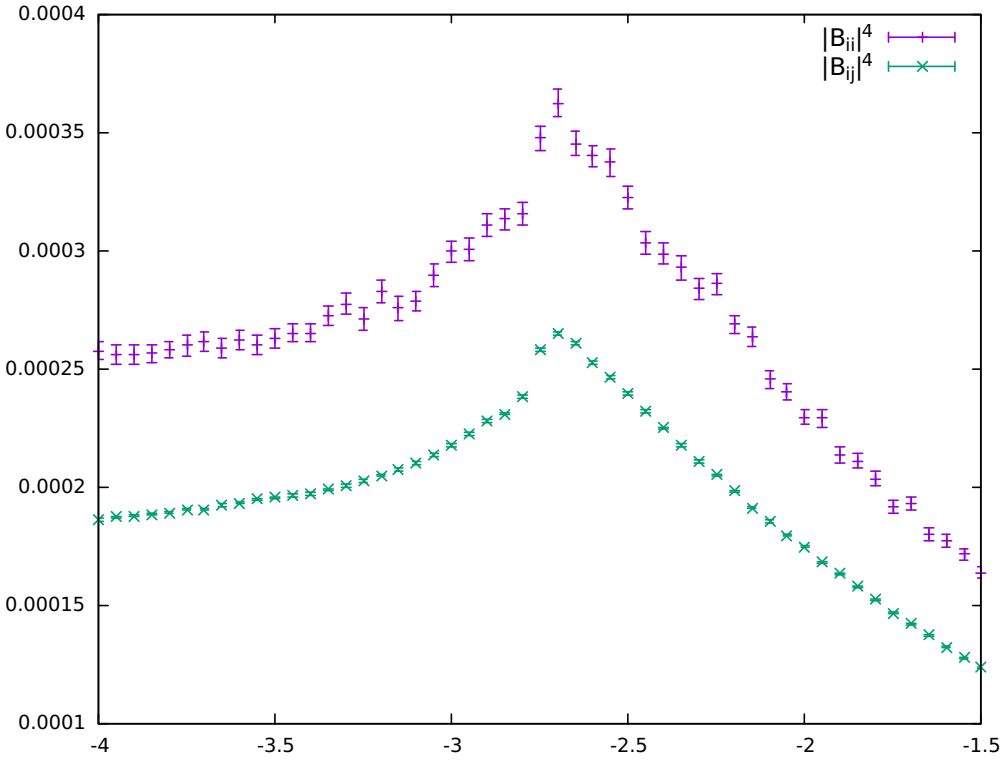

Figure 5: Expectation value of $|B_{ii}|^4$ (purple) and $|B_{ij}|^4$ (green) versus g_2. Matrix size 20x20.

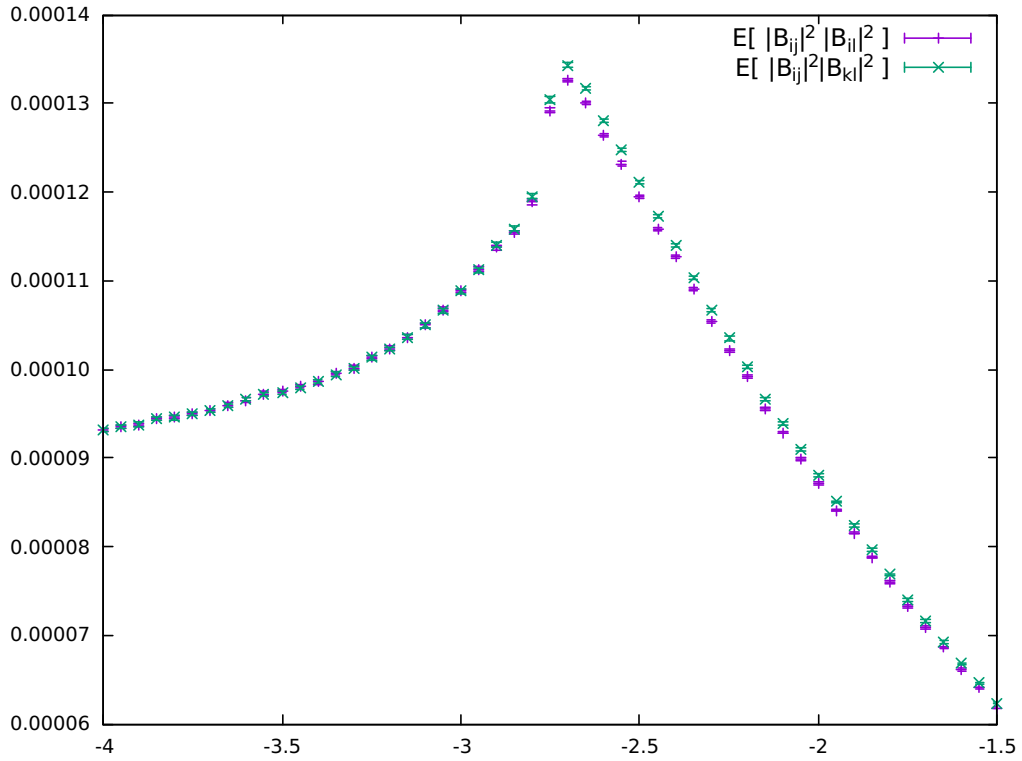

Figure 6: Expectation value of $|B_{ij}|^2|B_{il}|^2$ (purple) and $|B_{ij}|^2|B_{kl}|^2$ (green) versus g_2. Matrix size 20x20.

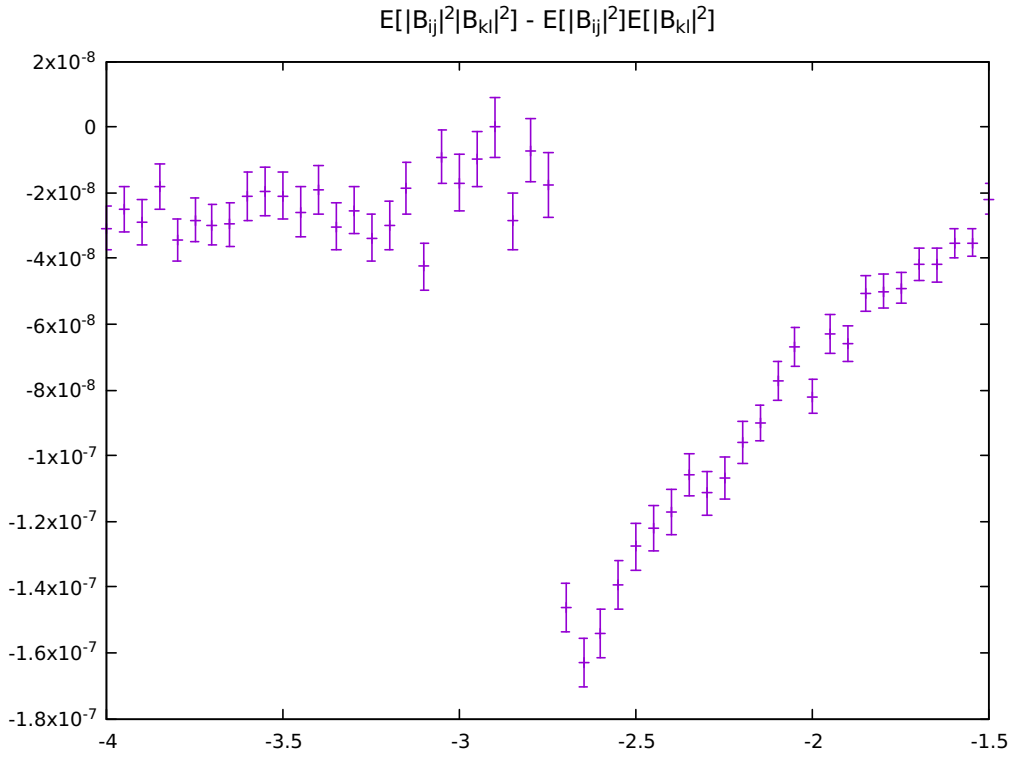

Figure 7: Statistical independence of matrix elements. $E[|B_{ij}|^2|B_{kl}|^2] - E[|B_{ij}|^2]E[|B_{kl}|^2]$ versus g_2. Matrix size 20x20.

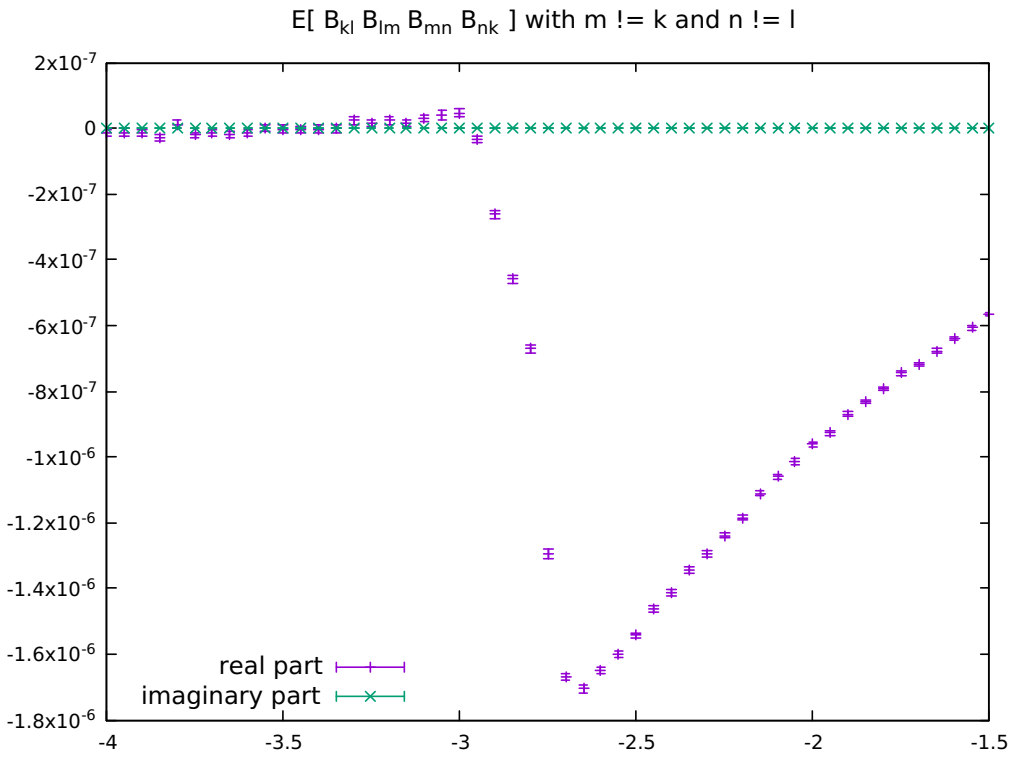

Figure 8: Expectation value of $B_{kl}B_{lm}B_{mn}B_{nk}$ with, $m \neq k$ and $n \neq l$ versus g_2. Real part in purple, imaginary part in green. Matrix size 20x20.