



Assigning property accent to \delta.

Assigning property AntiSymmetric to f.

Assigning property KroneckerDelta to \delta.

```
> susy:= { \delta{A_{a}} = \bar{\epsilonpsilon} \gamma_{a} \lambda,
           \delta{\lambda} = -(1/2) \gamma_{a b} \epsilonpsilon f_{a b} };

```

```
susy:= { \delta A_a = \bar{\epsilon} \gamma_a \lambda, \delta \lambda = (-1/2) \gamma_{ab} \epsilon f_{ab} };

```

```
> S:= -(1/4) f_{a b} f_{a b} - (1/2) \bar{\lambda} \gamma_{a} \partial_{a} \lambda;

```

```
S:= -1/4 f_{ab} f_{ab} - 1/2 \bar{\lambda} \gamma_a \partial_a \lambda;

```

```
> @vary!(%)( f_{a b} -> \partial_{a} \delta A_b - \partial_b \delta A_a,
            \lambda -> \delta \lambda );

```

```
S:= -1/4 ((\partial_a \delta A_b - \partial_b \delta A_a) f_{ab}) - 1/4 (f_{ab} (\partial_a \delta A_b - \partial_b \delta A_a)) - 1/2 \bar{\delta \lambda} \gamma_a \partial_a \lambda - 1/2 \bar{\lambda} \gamma_a \partial_a \delta \lambda;

```

```
> @distribute!(%): @prodsort!(%): @canonicalise!(%): @collect_terms!(%);

```

```
S:= -\partial_a \delta A_b f_{ab} - 1/2 \bar{\delta \lambda} \gamma_a \partial_a \lambda - 1/2 \bar{\lambda} \gamma_a \partial_a \delta \lambda;

```

```
> @substitute!(%)( @susy ): @prodrule!(%): @distribute!(%): @unwrap!(%);

```

```
S:= -\bar{\epsilon} \gamma_b \partial_a \lambda f_{ab} - 1/2 f_{cb} \overline{(-1/2) \gamma_{cb} \epsilon} \gamma_a \partial_a \lambda + 1/4 \bar{\lambda} \gamma_a \gamma_{cb} \epsilon \partial_a f_{cb};

```

Rewrite the Dirac bar acting on the product.

```
> @rewrite_diracbar!(%);

```

Warning: assuming Minkowski signature.

```
S:= -\bar{\epsilon} \gamma_b \partial_a \lambda f_{ab} - 1/4 f_{cb} \bar{\epsilon} \gamma_{cb} \gamma_a \partial_a \lambda + 1/4 \bar{\lambda} \gamma_a \gamma_{cb} \epsilon \partial_a f_{cb};

```

```
> @substitute!(%)( \partial_{c} f_{a b} -> \partial_{c} f_{a b} ):
@pintegrate!(%){\ppartial}:
@rename!(%){\ppartial}{\partial}:
@prodrule!(%): @unwrap!(%);

```

```
S:= -\bar{\epsilon} \gamma_b \partial_a \lambda f_{ab} - 1/4 f_{cb} \bar{\epsilon} \gamma_{cb} \gamma_a \partial_a \lambda - 1/4 \partial_a \bar{\lambda} \gamma_a \gamma_{cb} \epsilon f_{cb};

```

Now we do the remaining gamma matrix algebra.

```
> @join!(%){expand}: @distribute!(%): @eliminate_kr!(%): @prodsort!(%);

```

```
S:= -\bar{\epsilon} \gamma_b \partial_a \lambda f_{ab} - 1/4 \bar{\epsilon} \gamma_{cba} \partial_a \lambda f_{cb} - 1/4 \bar{\epsilon} \gamma_c \partial_a \lambda f_{ca} + 1/4 \bar{\epsilon} \gamma_b \partial_a \lambda f_{ab} - 1/4 \partial_a \bar{\lambda} \gamma_{acb} \epsilon f_{cb} - 1/4 \partial_c \bar{\lambda} \gamma_b \epsilon f_{cb} + 1/4 \partial_b \bar{\lambda} \gamma_c \epsilon f_{cb};

```