Algebraic Methods for Multi-Loop Integrals

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Exercise: MINCER and IBP

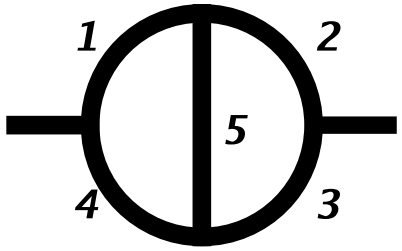
- file `MINCER/t1.frm`:

```
#define TOPO "t1"
   ...
L dia = I(n1,n2,n3,n4,n5);

multiply,replace_(n1,1,n2,1,n3,1,n4,1,n5,1);

id I(n1?,n2?,n3?,n4?,n5?) =
  1/p1.p1^n1/p2.p2^n2/p3.p3^n3/p4.p4^n4/p5.p5^n5;
  ...
```

- `cd MINCER; form t1.frm`
- evaluates



$$= \int \frac{1}{(p_1^2)^{n_1}(p_2^2)^{n_2}(p_3^2)^{n_3}(p_4^2)^{n_4}(p_5^2)^{n_5}}$$

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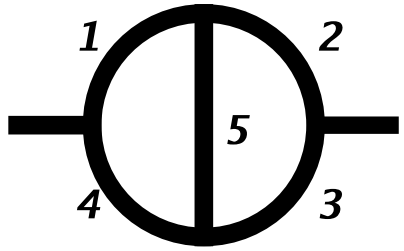
- 

$$= \int \frac{1}{(p_1^2)^{n_1}(p_2^2)^{n_2}(p_3^2)^{n_3}(p_4^2)^{n_4}(p_5^2)^{n_5}}$$

- evaluate a recurrence relation by applying

$$\frac{\partial}{\partial p_1} \cdot p_1$$

- note: assume p_2 and p_3 independent of p_1, and

$$p_5 = p_1 - p_2\,, \qquad p_4 = p_1 - Q$$

- check your recurrence relation with the help of `t1.frm`

Exercise: AIR

- directory `AIR/topT1`
- `maple script_T1.map`
- run `check_T1.map`
- which integrals with five propagators can you evaluate?