

```

 $x_ \leq y_ := \text{OrderedQ}[\{x, y\} /. \$PBWRule]; \quad x_ < y_ := ! \text{OrderedQ}[\{y, x\} /. \$PBWRule];$ 
UUi[1] := Ui[];
UUi[ $x_^{p_}$ ] := UUi @@ Table[x, {p}];
UUi[ $\mathcal{E}_$ ] :=  $\mathcal{E}$  /. {
    U[ $xs_$ ]  $\Rightarrow$  Ui[ $xs$ ],
     $x_$  /; MemberQ[$Basis, x]  $\Rightarrow$  Ui[x]
};
UUi[ $x_$ ,  $xs_$ ] := UUt1[x] UUt2[ $xs$ ] // Expand // mt1,t2→i;
USimp[ $\mathcal{E}_$ ] := Collect[ $\mathcal{E}$ , Times[U[_]] .., Expand];
USimp[ $\mathcal{E}_$ ] := Expand[ $\mathcal{E}$ ];

```