

ProudBs [$n_$, 0] := {BR [n , {}]};

ProudBs [$n_$, 1] := BR [n , {#}] & /@ (Range [$n - 1$] U (-Range [$n - 1$]));

ProudBs [$n_$, $m_$] /; $m > 1$:=

Flatten [ProudBs [n , $m - 1$] /. BR [n , { σ ___, $\sigma_$ }] => (BR [n , { σ , σ , #}] & /@ PF [n , σ])]