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to non-crossing permutation :
Dyck paths \longrightarrow Permutations

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Description

Sends a Dyck path D with valley at positions $\{(i_1, j_1), \dots, (i_k, j_k)\}$ to the unique non-crossing permutation π having descents $\{i_1, \dots, i_k\}$ and whose inverse has descents $\{j_1, \dots, j_k\}$.

It sends the area www.findstat.org/StatisticsDatabase/St000012/ to the number of inversions www.findstat.org/StatisticsDatabase/St000018/ and the major index www.findstat.org/StatisticsDatabase/St000027/ to $n(n-1)$ minus the sum of the major index www.findstat.org/StatisticsDatabase/St000004/ and the inverse major index www.findstat.org/StatisticsDatabase/St000305/.

References

[1] **Stump, C.** *More bijective Catalan combinatorics on permutations and on signed permutations* www.ams.org/mathscinet/search/publdoc.html?pg1=MR&s1;=3153083 www.arxiv.org/abs/0808.2822

Code

```
def to_noncrossing_permutation(elt):  
    return elt.to_noncrossing_permutation()
```