

www.FindStat.org/St001055

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Collection

Integer partitions

Description

The Grundy value for the game of removing cells of a row in an integer partition. Two players alternately remove any positive number of cells in a row of the Ferrers diagram of an integer partition, such that the result is still a Ferrers diagram. The player facing the empty partition loses.

References

[1] **Row, A.** *Ordered Nim game* mathoverflow.net/questions/286925

Code

```
@cached_function
def statistic(la):
    """Return the Grundy value of the partition for
    the game
    where one may remove a positive number of cells
    in one row.
    """
    def children(la):
        if len(la) == 0:
            return
        for i in range(len(la)-1):
            for j in range(1, la[i]-la[i+1]+1):
                mu = [la[k] if k != i else la[k]-j
                     for k in range(len(la))]
                yield Partition(mu)
        for j in range(1, la[-1]+1):
            mu = la[:-1] + [la[-1]-j]
            yield Partition(mu)

    l = [statistic(mu) for mu in children(la)]
    i = 0
    while i in l:
        i += 1

    return i
```

