

Exercise 3.55.

Define a procedure `partial-sums` that takes as argument a stream S and returns the stream whose elements are $S_0, S_0 + S_1, S_0 + S_1 + S_2, \dots$. For example, `(partial-sums integers)` should be the stream 1, 3, 6, 10, 15, ...

Answer.


We see that `(partial-sums S)` is a stream beginning with S_0 , and the rest of the stream can be generated by adding itself to `(stream-cdr S)`, as figure 1 shows.

S_0	$S_0 + S_1$	$S_0 + S_1 + S_2$	$\dots = (\text{partial-sums } S)$
S_1	S_2	S_3	$\dots = S$
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S_0	$S_0 + S_1$	$S_0 + S_1 + S_2$	$S_0 + S_1 + S_2 + S_3 \quad \dots = (\text{partial-sums } S)$

Figure 1. Process of generating elements of the stream `(partial-sums S)`.

Now we can define `(partial-sums S)` as follows:

```
(define (partial-sums S)
  (cons-stream (stream-car S)
    (add-streams (partial-sums S)
      (stream-cdr S))))
```

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