

## 8.4: Another Way of Writing the Action Integral

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Up to this point, we've always written the action as an integral of the Lagrangian with respect to time along the path,

[Math Processing Error]

However, the expression derived in the last section for the increment of action generated by an incremental change in the path endpoint is clearly equally valid for the contribution to the action from some *interior* increment of the path, say from [Math Processing Error] so we can write the total action integral as the sum of these increments:

[Math Processing Error]

In this integral, of course, the [Math Processing Error] add up to cover the whole path.

(In writing [Math Processing Error] we're following Landau's default practice of taking the action as a function of the final endpoint coordinates and time, assuming the beginning point to be fixed. This is almost always fine—we'll make clear when it isn't.)

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