High input impedance integrator

When integrating a voltage signal from a high output impedance source, the usual type of op-amp integrator is often unsuitable if the integrating resistor is smaller or of the same order as the source output impedance. This problem can be overcome using the following circuit. Capacitor C and two resistors provide the integrating time constant. If op-amp A_1 is chosen so that its input offset voltage and input bias currents are sufficiently small so as to be negligible, then the output of A_1 becomes $V_1 = V_{in} + 1/RC \int V_{in} dt$. By the addition of the second amplifier A_2 and the two 10kΩ resistors, V_{in} is subtracted from V_1 and the output is inverted. The output thus becomes $V_{out} = -1/RC \int V_{in} dt$. Consequently V_{out} is the same as the desired output from the simple integrator with the added advantage that the input resistance is extremely high.

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