Is it possible to stop the program execution when a CPU register is written with a specific value?

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It is not possible to stop the program execution on a CPU register read or write, since this is not supported by any processor on-chip debug implementations. It is only possible to set breakpoints on program execution or memory accesses (read/write).

It is however possible to set a program or read/write breakpoint on a memory address with the condition that a CPU register has a specific value, e.g.:

Break.Set myFunc /Program /CONDition Register(R0)==0

TRACE32 will stop here the program execution every time the function myFunc is executed and will check the condition "*Register(R0)==0*". If the condition is false, the program execution will be resumed.