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Supporting Information to:
"Single Scan, Sensitivity- and Gradient-Enhanced TROSY for Multidimensional NMR Experiments"
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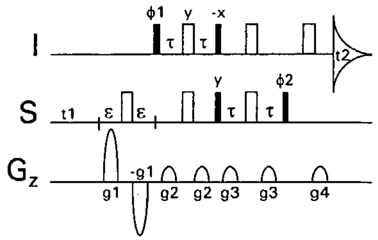
Cartesian product operator[1] analysis of the following pulse sequence element to select different subspectra

Pulse sequence:



gradients labeled g1 and g4 of equal length
$\tau = 1/4J_{IS}$
$J_{IS} < 0$

Terms present by the end of t_1:[2]	$\cos(\omega_S t_1)\cos(\pi J_{IS} t_1)2S_xI_z + \sin(\omega_S t_1)\cos(\pi J_{IS} t_1)2S_yI_z + \cos(\omega_S t_1)\sin(\pi J_{IS} t_1)S_y - \sin(\omega_S t_1)\sin(\pi J_{IS} t_1)S_x$

Experiment[3]	g1	ϕ1	ϕ2	Terms present at the start of t_2	Add = A + B **Subtract = A - B** [4, 5]	Subspectrum
1A	$\lvert\gamma_I/2\gamma_S\rvert$g4	y	x	$-0.5\sin((\omega_S - \pi J_{IS})t_1)(I_x + 2I_xS_z) - 0.5\cos((\omega_S - \pi J_{IS})t_1)(I_y + 2I_yS_z)$	$-\sin((\omega_S - \pi J_{IS})t_1)(I_x + 2I_xS_z)$	o o
1B	$-\lvert\gamma_I/2\gamma_S\rvert$g4	-y	-x	$-0.5\sin((\omega_S - \pi J_{IS})t_1)(I_x + 2I_xS_z) + 0.5\cos((\omega_S - \pi J_{IS})t_1)(I_y + 2I_yS_z)$	**$-\cos((\omega_S - \pi J_{IS})t_1)(I_y + 2I_yS_z)$**	o x
2A	$\lvert\gamma_I/2\gamma_S\rvert$g4	-y	-x	$0.5\sin((\omega_S + \pi J_{IS})t_1)(I_x - 2I_xS_z) + 0.5\cos((\omega_S + \pi J_{IS})t_1)(I_y - 2I_yS_z)$	$\sin((\omega_S + \pi J_{IS})t_1)(I_x - 2I_xS_z)$	x o
2B	$-\lvert\gamma_I/2\gamma_S\rvert$g4	y	x	$0.5\sin((\omega_S + \pi J_{IS})t_1)(I_x - 2I_xS_z) - 0.5\cos((\omega_S + \pi J_{IS})t_1)(I_y - 2I_yS_z)$	**$\cos((\omega_S + \pi J_{IS})t_1)(I_y - 2I_yS_z)$**	o o
3A	$\lvert\gamma_I/2\gamma_S\rvert$g4	y	-x	$-0.5\sin((\omega_S - \pi J_{IS})t_1)(I_x - 2I_xS_z) - 0.5\cos((\omega_S - \pi J_{IS})t_1)(I_y - 2I_yS_z)$	$-\sin((\omega_S - \pi J_{IS})t_1)(I_x - 2I_xS_z)$	o o
3B	$-\lvert\gamma_I/2\gamma_S\rvert$g4	-y	x	$-0.5\sin((\omega_S - \pi J_{IS})t_1)(I_x - 2I_xS_z) + 0.5\cos((\omega_S - \pi J_{IS})t_1)(I_y - 2I_yS_z)$	**$-\cos((\omega_S - \pi J_{IS})t_1)(I_y - 2I_yS_z)$**	x o
4A	$\lvert\gamma_I/2\gamma_S\rvert$g4	-y	x	$0.5\sin((\omega_S + \pi J_{IS})t_1)(I_x + 2I_xS_z) + 0.5\cos((\omega_S + \pi J_{IS})t_1)(I_y + 2I_yS_z)$	$\sin((\omega_S + \pi J_{IS})t_1)(I_x + 2I_xS_z)$	o x
4B	$-\lvert\gamma_I/2\gamma_S\rvert$g4	y	-x	$0.5\sin((\omega_S + \pi J_{IS})t_1)(I_x + 2I_xS_z) - 0.5\cos((\omega_S + \pi J_{IS})t_1)(I_y + 2I_yS_z)$	**$\cos((\omega_S + \pi J_{IS})t_1)(I_y + 2I_yS_z)$**	o o

1 Sørensen, O. W.; Eich, G. W.; Levitt, M. H.; Bodenhausen, G.; Ernst, R. R. *Prog. NMR Spectrosc.* **1983**, 16, 163-192.
2 Assuming the term $2S_xI_z$ is present at the beginning of t_1.
3 Two free induction decays must be recorded per t_1 increment to obtain one subspectrum. Corresponding gradient and phase settings are indicated in rows labeled A and B.
4 By adding and subtracting the two data sets in column 5, the terms indicated in the table are obtained, A+B (normal text) **A-B (boldface)**. These correspond to the real and imaginary parts of a hypercomplex data set recorded in the States manner, except the two signals are 90° out of phase in the acquisition dimension [States, D. I.; Haberkorn, R. A.; and Ruben, D. J. *J. Magn. Reson.* **1982**, 48, 286-292.]. Before applying a complex Fourier transform in the indirect dimension one of the two data sets must therefore be phaseshifted by 90° in the acquisition dimension.
5 This processing protocol is the standard processing scheme for experiments recorded with pulsed field gradients for coherence order selection. [Palmer, A. G.; Cavanagh, J.; Wright, P. E.; Rance M. *J. Magn. Reson.* **1991**, 93, 151-170. Kay, L. E.; Keifer, P.; Saarinen, T.; *J. Am. Chem. Soc.* **1992**, 114, 10663-10665.] In Bruker XWINNMR software, this corresponds to the "echo-antiecho" processing flag.