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VIV experiments with a semi-immersed vertical flexible cylinder driven by top motion RODOLFO GONCALVES, GUILHERME FRANZINI, CELSO PESCE, ANDRE FUJARRA, University of Sao Paulo, PEDRO MENDES, Petrobras — An experimental investigation of the VIV phenomenon with a long and flexible cylinder was carried out at a recirculating water channel facility and intends to better understand regarding risers non-linear dynamics. The cylinder total length is $L=2520\text{mm}$ with an immersed length $L_i=720\text{mm}$ and the diameter $D=22.2\text{mm}$, current velocities up to 0.4m/s are carried out in the immersed portion to promote vortex-shedding and consequently VIV. The mass parameter, m^* is close to 10. Prescribed vertical and monochromatic harmonic motions were imposed at the top aiming at causing geometric stiffness modulation and, therefore, eigen frequencies oscillations, together with current excitation. The motion imposed at the top has amplitude $A_t/L=1\%$ and was imposed at three frequencies ratios, with respect to the first natural frequency in still water: $f_t:f_{N,1}=1:3,1:2,1:1$. Cartesian displacement time-series were obtained for 44 tracking-points, marked with reflective targets placed all along the model, by using a Qualisys optical motion capture system. As expected, a much richer spectral content is revealed under imposed motions than in its absence, i.e. only current condition. The presence of subharmonic components in the response spectra is analogous to the response of a classic parametrically excited system. It was also observed a marked increase of the maximum response amplitude in the case $f_t:f_{N,1}=1:1$

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